

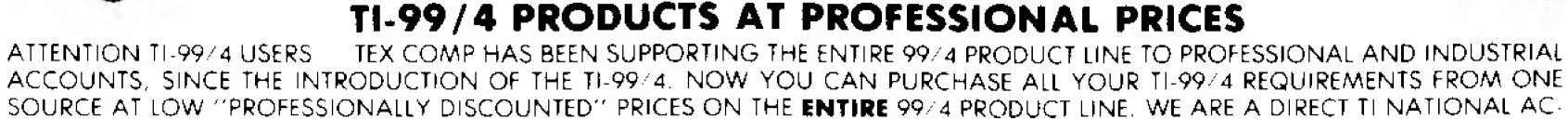


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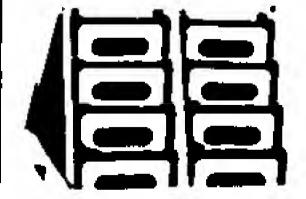
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#### **GUTSIDE 99'ER**



#### This Issue's Cover

Our talented staff artist, Laredo, has transported a familiar Christmas scene into the computer age. No wonder Santa Claus is using a Home Computer to run his ever-expanding workshop—he just had to have one of his own after seeing it on so many of the lists he receives from good little boys and girls (of all ages). Santa well knows that good tools make life easier. Already his Home Computer has bailed him out more often than all the elves and reindoer—even Rudolph—combined. In fact, his latest software tools have streamlined the Christmas delivery operation so well, that perhaps more people will start believing Santa really does all that work in just one night.

INSIDE 99'EA

A daptation to sophisticated tools distinguishes humans from other life forms on the good ship Earth. The creation of tools by the few for use by the many continually expands the horizons of our society. The advent of the TI Home Computer and its ensuing proliferation have set the stage for a new class of powerful tools for common use—computer programs

Once confined to scientific laboratories and huge corporate centers, utilitarian computer progams are now finding a place in many homes Whether for word processing or home finances, these software tools are proving themselves invaluable.

THEST: The Home Computer Show was the springboard for some new programs in this category. To see what else happened at this historic event; browse through our four page photo tour of the show. By the way, we have an additional photo spread for you—one that illustrates with holiday spirit just how Texas Instruments produces the Home Computer. So be sure to also check our timely Santa's Workshop.

With photographic visions now cancing in your head, let's turn to the text—a text editor, that is. Tex-Scribe: A Text Editor for the Home Computer offers you a powerful writing tool. Once you have tried a text editor, you may decide to write a book or at least an epic poem.

You say that you need an idea for a poem? For a seasonal sample, read A Christmas Computer Carol. Even Santa got a chuckle out of it! Speaking of Christmas verses, did you get your greeting cards mailed out without trouble? Next year, you may find a mailing list program to be a useful tool for this purpose. We've

reviewed one for you in *Managing A. Mailing List the Futura Way.* 

Wouldn't it be fun to design your own customized Christmas cards using the graphics of the Home Computer? Plotting with the Home Computer gives you dot-plot capability from TI BASIC using the TI Mini-Memory cartridge! And If your program for graphics design gets too complex, you might just wind up exclaming, Oh No! Memory Fuil! For some practical tips on what to do in this case, read Regena's "memorable" article.

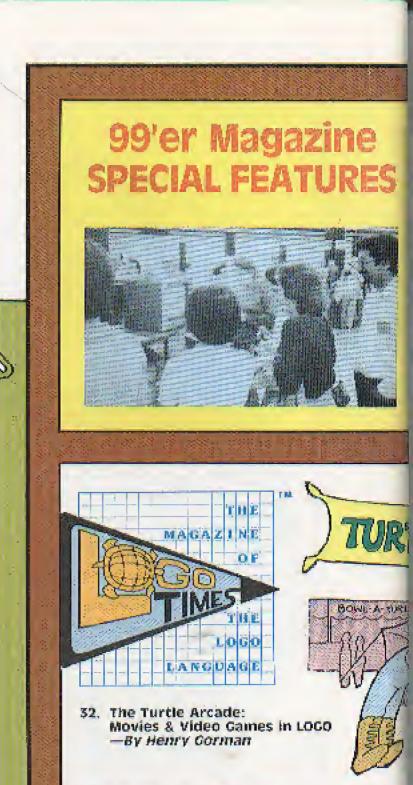
After working hard all day using your new tools, it is time to unwind with some Computer Gaming. The younger family members will enjoy piloting their own TI BASIC *Termite* through his wooden log. But watch out for knotholes!

To extend your basic gaming enjoyment, be sure to stake your claim in the 99'er *Gold Rush*—an Extended BASIC graphic-arcade-adventure game for the whole family. Catch the fever, but keep your powder dry.

The biggest hit in Computer Gaming Land at Ti-Fest was the new Parsec video arcade game from Ti. It has everything including a talking, onboard-computer! Read the review of this exciting game—it's going to blast you right out of your space boots!

Playing all these computer games may cause you to attempt programming one yourself. If LOGO is your language choice for this project, The Turtle Arcade: Movies & Video Games in LOGO will be right up your alley ....

All the elves and other lively spirits here at 99'er Magazine would now like to wish you a joyous and prosperous Holiday Season. And may all your programs RUN bug-free...



#### Programming Conventions

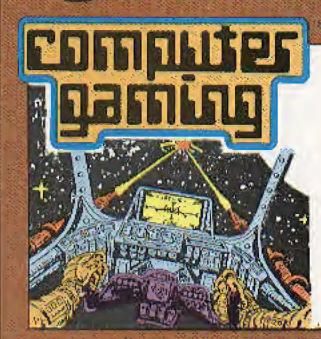
KEY-IN REFERENCE

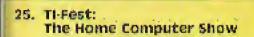
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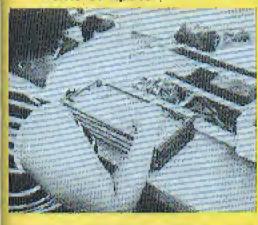
Program as listed will completely fill available memory of TI-98-6A and cannot be RUN with disk controller (and possible RSZ32 interface) turned on it must be SAVED and RUN from cassette; it may also possibly be SAVED and RUN from disk in Eurendad BASIC with the 32K memory peripheral if the last 2 character sets were not used.

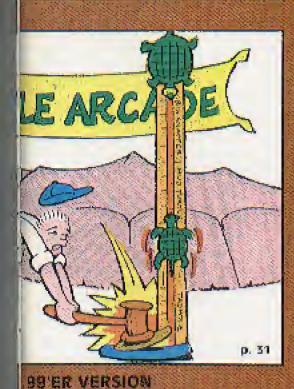
send of Program or Article





56. Santa's Workshop: The Making of a **Home Computer** 

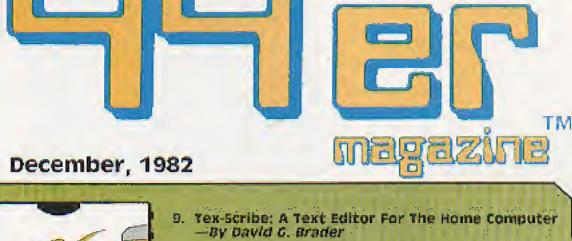






Assembly Language
Mini-Memory Roddired
52K Expansion Memory Required—

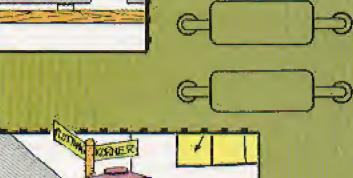




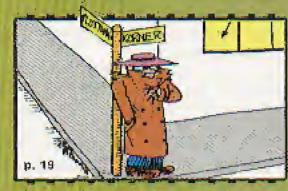


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  —By Steve Davis







19. Plotting With the Home Computer —By Joseph C. DeVincentis, Jr.

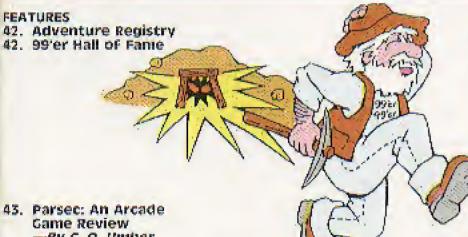




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Ti extended Basic+



**CAMEWARE BUFFET** Two program entrees for the hungry game player.



43. Parsec: An Arcade **Game Review** —By C. Q. Umber



#### A Resource for People Interested in the Enrichment of Personal Computing

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## ON SCREEN

"What's a nice little computer magazine like you doing in a place like this?"

m how business—you'd think it would be the farthest thing from the regimented life of publishing a monthly computer magazine, right? Well, I used to think so—that is, until this very same magazine put on the greasepaint, encouraged the crowd to roar, and produced the very first Home Computer Show.

The October, San Francisco event is now history. In this issue, we've reproduced a collection of photographs taken during the show that (we hope) conveys the exciting mood of the occasion. My staff and I were thrilled to have had the opportunity to meet many of our readers worldwide who attended the event, and now are eager to share the experience of 99'er TI-Fest with the rest of you.

The idea behind TI-Fest was to produce a computer-awareness show directed at and structured for a diverse group of people with little or no computer experience. The scores of computer shows that have preceeded TI-Fest have either been geared to hobbyists, businessmen, or members of the computer industry itself. And like the TI Home Computer that spawned it, a show of this type had been regarded as a concept a little too early for its time . . .

Well, the pundits were proved wrong again. Judging from the crowds that turned out, and the enthusiastic comments of happy showgoers and exhibitors alike, the event was a huge success. It seems to indeed be possible to produce a large computer show that all family members can enjoy and learn from—a show geared to the type of people who are now turning out by the hundreds of thousands to buy inexpensive, versatile computers for entertainment, education, home management, computer literacy, as well as small business and professional use.

We at 99'er Magazine are extremely proud to have played a part in the creation of an institution that promises to proliferate across the country and usher in a new age of computer awareness and use. We're also very proud to have had the support and the opportunity to work with a company like

Texas Instruments who had the faith to stand by us and make the event happen.

As publisher of this magazine and producer of the show, there are many people I personally am indebted to. First, there are the members of my hard-working staff who pushed themselves beyond what we previously thought were the limits of human endurance in preparing for, transporting, setting up, running, and tearing down the show. And all this while I saddled them with the burden of conversion to a monthly publication schedule!

Then there were the individual Tlers themselves: first the management people like Bill Turner, Gary Rado, and Don Bynum who committed the necessary TI resources that made the show possible. Special thanks are due to Don Bynum, manager of the Personal Computer Division, for taking the time out of his busy schedule to fly out to the show and engage Home Computer users in a lively Q & A forum. We'll have excerpts of the session in a forthcoming issue.

Of course, Don wasn't the only one who made the trip out from Lubbock and Dallas—many technical support personnel from Consumer Products Group and Corporate Engineering Center helped us hook up equipment, present seminars, and answer technical questions. The tutorial seminars presented by Tlers on computer languages, word processing, and interactive video were especially well received; for that I have people like Jim Dugan, John Acker, Alan Acree, John Di Angelo, and Leon Tietz to thank.

Then there are all the other non-Tler seminar speakers to thank—familiar 99'er authors, advertisers, and others who presented a wealth of stimulating, informative material. Much of this material has already suggested ideas for new articles and features for publication in forthcoming issues of this magazine. I'm especially grateful to Hank Gorman, Roger Kirchner, George Gerhold, Charles Ehninger, Norma Clulow, Sam Jenkins and John Barnett for traveling the collective

#### By Gary M. Kaplan Publisher & Editor-in-Chief

thousands of miles to attend the show and prepare their excellent seminars and workshop materials.

Liaison and behind-the-scenes contracting contributed a vital measure of support to this show's successful production. Bill Hardin of Hardin's Computer Solutions worked with us very closely to ensure that our custom design for the large exhibit islands were correctly manufactured by his firm according to our critical specifications, and were then packed and shipped to us in Oregon in time for last-minute

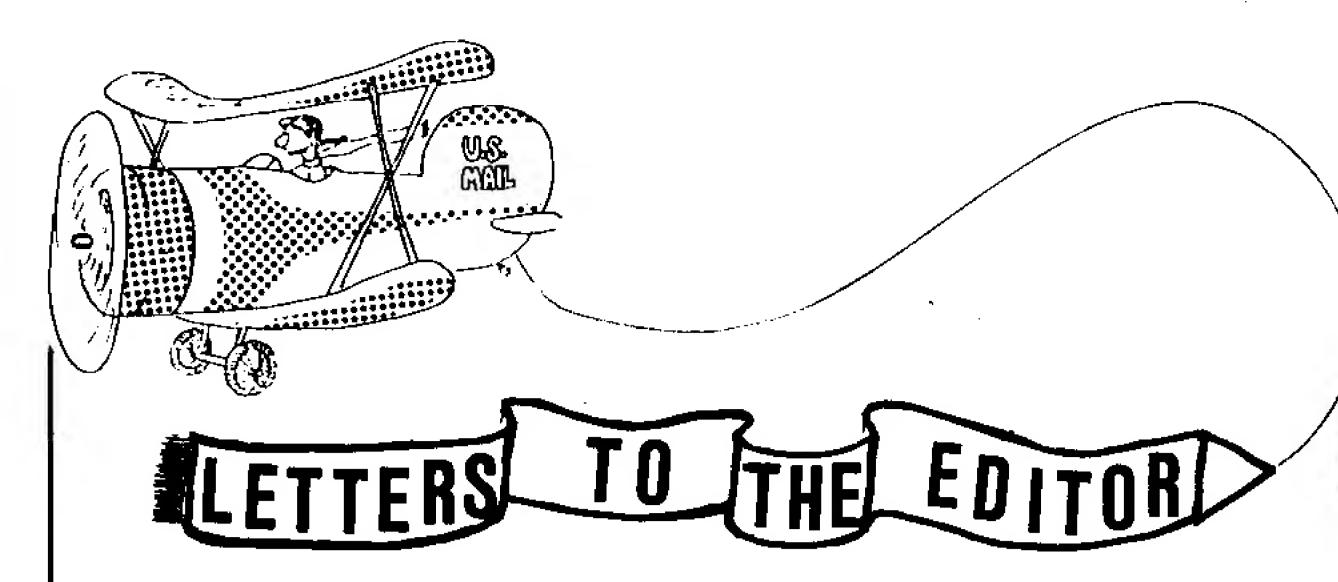
wiring and customizing.

The all-important TI liaison work was handled by Pat Bentley. I'm extremely grateful to Pat for his assistance prior to, during, and after TI-Fest. The logistics involving TI's participation were staggering, and Pat handled it all without a hitch. Special liaison thanks are also extended to John Yantis, who assisted in rounding up seminar speakers, and Jon Campbell of TI Press Relations who assisted me at the show in escorting several TV crews and members of the local press.

I was fortunate to also have local Bay Area support from people like Mary Fesler of the San Francisco TI Learning Center, and Steve Funk of the Personal Computer Association. Special thanks also go out to Bobbie Doyle, sales manager of the San Franciscan—our headquarters hotel, and to Jade Arthur and crew of Greyhound Exposition Services—our patient show decorator.

Now that 99'er TI-Fest is over, and we're back to our daily regimen, I can safely say that I'm looking forward to the next show. Having learned quite a lot from the experience, I now even know how to reply when asked a leading question like, "What's a nice magazine like you doing in a place like this?" I simply whip out my cane and derby hat, do a little dance number, and answer, "That's Show Biz . . ."

For the many hundreds of you readers who have telephoned about the availability of the TI-Fest seminar tapes and transcripts, I ask that you remain patient a little longer. We are presently undergoing the monumental task of transcribing the over 50 hours of tapes. Watch for availablity in a forthcoming issue.



Dear Sir:

As an avid reader of your magazine from its onset I have truly enjoyed every issue. I have always enjoyed reading other programmers' program listings to see if I can find shorter, easier or quicker methods of program execution. It never ceases to amaze me that there are so many different ways to program a routine and end up with more or less the same results. I have at times found it difficult to decipher small routines out of the large program listings, with all the GOTOs, GOSUBs and variable value changes.

Based on this, I thought it might be a nice addition to your magazine to have a noncompensatory reader-contributed section on short routines, maybe 25 program statements or less, open to all the languages for the TI Home Computer. I realize that not everyone enjoys programming or typing in lengthy programs but if these routines are kept short in length I feel we could all learn a lot more about the power of our computers.

Here is an Extended BASIC example that sets up a ricocheting sprite in an enclosed area:

100 CALL CLEAR :: CALL COLOR(2,6,6):: PRINT RPT\$("+",252);RPT\$("+",56):: R=40:: C=30:: CALL SPRITE(#1,42,2,25,17,R,C)

110 FDR K=1 TO 900 :: CALL POSITI

DN(#1,Y,X):: R=R+80\*((Y+R>200
)-(Y+R<-1)):: C=C+60\*((X+C>25
0)-(X+C<-1)):: CALL MOTION(#1
,R,C):: NEXT K

Craig Miller San Dimas, CA

Thanks for the sample program, Craig, It does indeed show how much power can be packed into a small amount of programming! We are happy to put such examples in this column. We also welcome articles which contain short program examples. . .

Dear Sir:

Thank you for publishing such a great magazine. If there is one thing I enjoy more than programming, it's receiving an issue of 99'er Magazine in the mail. It doesn't take me long to read the entire magazine, but I still end up reading it over and over.

Gregory M. Kean Princeton, NJ

Well, Gregory, now that 99 er is monthly, you should get double the enjoyment!

Dear Sir:

I am a new subscriber and have just recently received all six of your first issues. I am very pleased with them all and I only wish I could have heard of you sooner. It's a real pleasure to read a magazine that not only recognizes that the 99/4A is a computer, but also devotes so much time and space to it.

Ralph Wynn Virginia Beach, VA

Ralph, I think you were one of the last to receive all the back issues, because the first ones are now out-of-print! Take good care of those copies, their value is going up daily . . . Dear Sin:

I am a subscriber to your magazine and I think it is the greatest. When we first bought the TI-99/4A, I was disappointed with it in some ways and had been brain washed into thinking that the Apple was the computer everyone wanted and the others were just "toys." Thanks to "99'er" I have overcome this want for an Apple and am really glad we got a TI-99/4A after all.

Also, thank you very, very much for the John Clulow article "Magic Crayon: Learning Assembly Language the Hard Way." It is by far the very best article I have ever read in all the "99'ers." I have all of them and treasure each one. I had all sorts of fears of assembly language until I read that

article.

Jim O'Flaherty, Jr.
Denton, TX

Fear of Assembly Language indeed seems widespread. John will be pleased to learn his article was so well received.

Continued on p. 21

#### **Entering 99'er Programs**

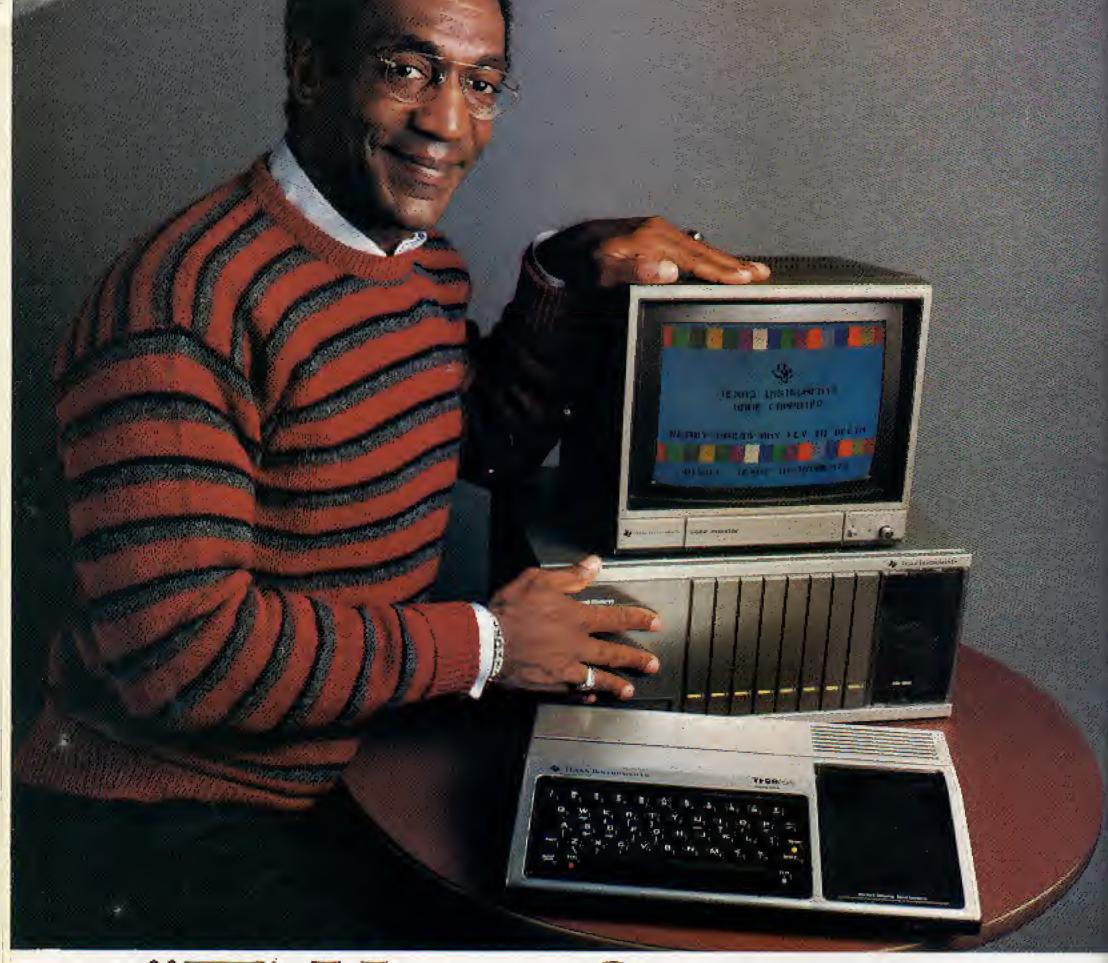
New readers should be aware that within the magazine's pages are found actual computer programs that you can put into your Home Computer and enjoy.

Make sure you have any special system components required by the program (i.e., the Speech Synthesizer, Extended BASIC cartridge, etc.). Then, using the console keyboard, you can type the printed magazine listing (character for character, and line by line) into the computer's memory.

Before entering the program, connect a cassette recorder to the computer. Make sure you have two blank cassette tapes. For each 10-20 lines you type in, use SAVE CS1 to save that program segment onto one of the tapes. Alternate between the two tapes each time you save the program. Be sure to rewind to the beginning of each tape before saving, so that you always record over and replace the shorter segment of program lines with the longer segment. By following this procedure, you'll always retain most of your work even if the lights go out or someone turns off the computer.

Double check your typing against the program listing for errors, and then have someone else check it. The most common errors are typing the letter "O" instead of the number "O" (zero)—they are not interchangeable to the computer. This is also true for the letters "I" and "L" and number

"1" (one). ISee "Key-In Reference" on p. 4)
Every time you make a correction to
your program, SAVE CS1 and switch the
tapes. Once all the errors are corrected,
you will have a good copy of the program
on the last tape. Before turning off the
computer, put the other cassette tape in
your recorder and once again SAVE CS1.
Now, if one tape gets damaged, you won't
have to enter the program listing via the
keyboard all over again. Have fun and happy computing.



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110 HZ to 40,000 HZ. High resolution video. U. & l.c. Single line overlay for 2nd function. Control & function keys. 16 color graphics with 4 modes & sprites.

Sound impressive? Compare a TI Home Computer with the competition and really be impressed. You won't even need a computer to tell you this is the one.

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As a special bonus, 99'er Magazine includes the bound-in publications— LOGO Times: The Magazine of the LOGO Language; Computer Gaming, a treasure-trove of fun and excitement; and Portable Computing, covering both hardware and software aspects of portability.

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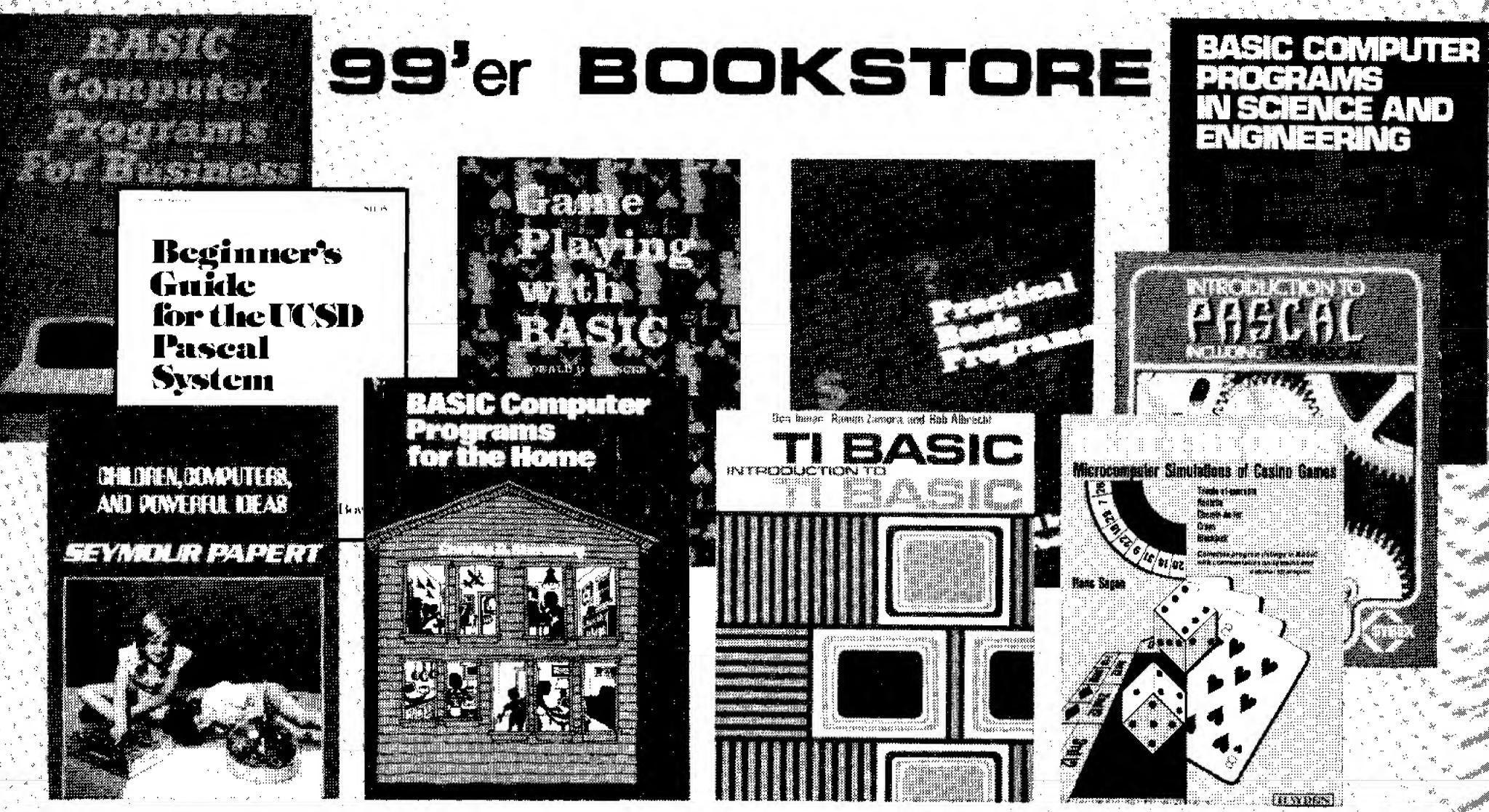
Each BIG issue of 99'er Magazine contains tutorials for beginners, applications tips and advanced programming techniques that keep the pros coming back for more, as well as nearly one dozen (!) ready-to-run computer programs for EVERYONE. Additionally, there's in-depth descriptions and reviews of the latest hardware, software, and books—timely information to keep its readers well informed and help them buy products wisely.



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#### MINDSTORMS: CHILDREN, COMPUTERS AND POWERFUL IDEAS

The definitive work on the philosophy behind LOGO. Excerpted in the Vol. ONO. I jude of this magazine.

Hardcover, \$13.95

1980, 230 pages, 6 x 9

#### BASIC COMPUTER PROGRAMS FOR BUSINESS: VOL. 1

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volume 1, paper, \$12.95 1980, 384 pages, 7 x 10

## BEGINNER'S GUIDE FOR THE UCSD PASCAL SYSTEM

By Kenneth Bowles

This highly informative book is written by the originator of the UCSD Pascal System. It is designed as an orientation guide for learning to use the UCSD Pascal System, and features tutorial examples of programming tasks in the form of self-study quiz programs. Once familiar with the system you will find the guide an invaluable reference tool for creating advanced applications.

paper, \$12.95 1980, 204 pages, 6 x 9

#### BASIC COMPUTER PROGRAMS FOR THE HOME

By Charles D. Sternberg.

An invaluable book containing over 75 practical home application programs that will be helpful to the novice or experienced owner in increasing the usefulness of any home computer. Each program is documented with a description of its functions and operation, a listing in BASIC, a symbol table, sample data, and one or more samples.

paper, \$11.95 1979, 336 pages, 7 x 10

#### **GAME PLAYING WITH BASIC**

By Donald D. Spencer.

Enjoy the challenge of competition with your computer. Amuse yourself with such games and puzzles as 3-D Tic-tac-toe, Nim, Roulette, Magic Squares, the 15 Puzzle, Baccarat, Knight's Magic Tour, and many others. The writing is nontechnical, allowing almost anyone to understand computerized game playing.

paper, \$11.50 1977, 176 pages, 6 x 9, illus.

#### BASIC COMPUTER PROGRAMS IN SCIENCE AND ENGINEERING

By Jules H. Gilder.

Save time and money with this collection of 114 ready-to-run BASIC programs for the hobbyist and engineer. There are programs to do such statistical operations as means, standard deviation averages, curve-fitting, and interpolation. There are programs that design antennas, filters, attenuators, matching networks, plotting, and histogram programs.

paper, \$11.95 1980, 160 pages, 6 x 9, illus.

#### PRACTICAL BASIC PROGRAMS

Edited by Lon Poole

Here is a new collection of 40 programs you can easily key in and use on most microcomputers, Each program does something useful. Practical BASIC Programs is especially useful in small business applications. It solves problems in finance, management decision, mathematics and statistics. It requires no prior programming knowledge. Each program is thoroughly documented. The book contains sample runs, practical problems, BASIC source listings, and an easy to follow narrative to help you realize the potential uses of each program.

> paper, **\$16.**50 1980, 200 pages, 8½ x 11

## INTRODUCTION TO PASCAL (INCLUDING UCSD PASCAL)

By Rodnay Zaks

This is the first book on Pascal that can be used by persons who have never programmed before, but more generally it is a simple and comprehensive introduction to standard and UCSD Pascal for anyone—beginner to experienced programmer—who wants to learn the language rapidly. The logical progression and graduated exercises—designed to provide practice as well as test skill and comprehension—enable the reader to begin writing simple programs almost immediately.

paper, \$16.95 1981, 440 pages, 7 x 9

#### INTRODUCTION TO TI BASIC

By D. Inman, R. Zamora, and R. Albrecht.

This comprehensive work will teach you all about computers and BASIC for use with the Texas Instruments Home Computer. Even if you've never worked with a computer, you can now teach yourself how to use. program and enjoy the TI Home Computer with this entertaining, and easy-to-read work. The authors have carefully constructed this introduction so that you will soon be writing BASIC programs and exploiting all of the excellent features of the TI machines. Its 14 chapters and Appendices cover all of the essential programming statements and machine features.

> paper, \$12.95 1980, 384 pages, 7 x 10

#### BEAT THE ODDS: MICRO-COMPUTER SIMULATIONS OF CASINO GAMES

By Hans Sagan.

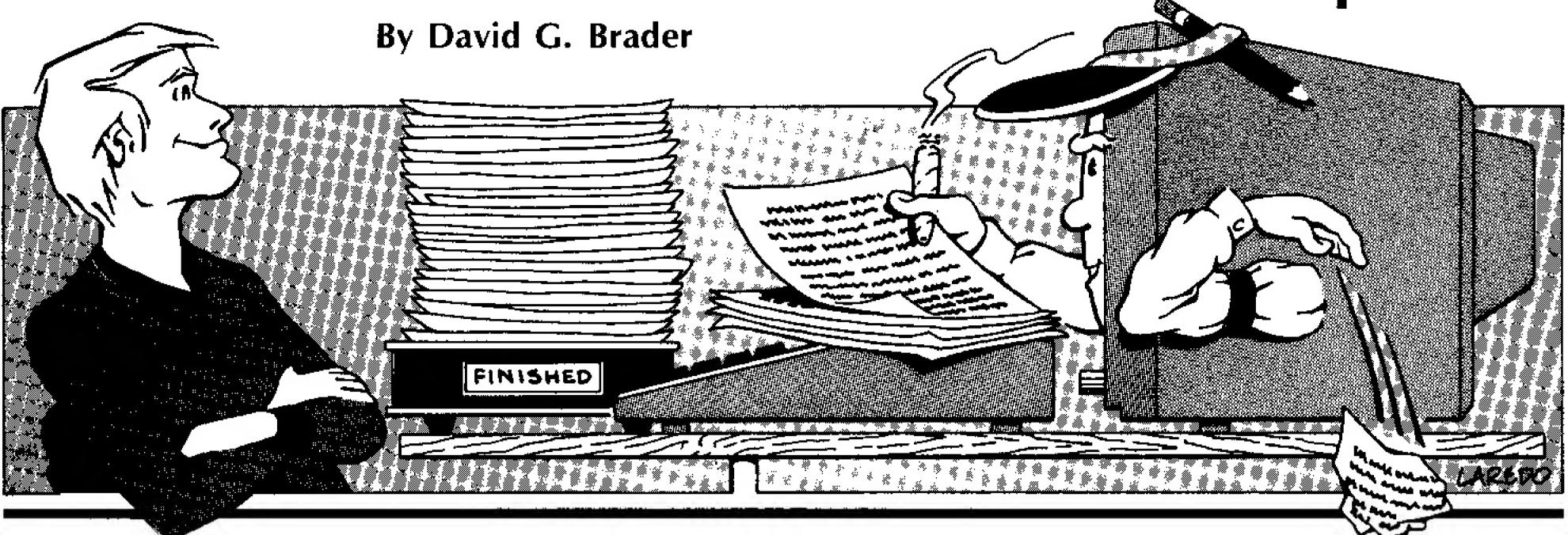
Here's an extremely useful programming guide that provides realistic simulations of five popular Casino games: Trente-et-Quarante (Thirty and Forty), Roulette, Chemin-de-Fer, Craps, and Blackjack, Each of the five chapters has the same structure. It begins with a computer run, displaying facets of the programs, followed by an explanation of the objectives and the physical execution of the game. Acceptable bets and how to place them are discussed and systems and/or strategies laid out. Finally, the computer program is developed and various modifications of the program are detailed.

paper, \$9.95 1980, 128 pages, 6 x 9

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## Tex-Schibe:

A Text Editor for the Home Computer



ou may picture a Text Editor as a cigar-smoking man in a green eyeshade working at a paper-littered desk in some big-city newspaper office. But the type of text editor covered in this article is *not* human. It is a computer program that works on the TI Home Computer—a *tool* for speeding the creation and modification of text information. If John Milton had been able to utilize such a text editor, he just might have finished *Paradise Lost* before going blind!

A text editor is more versatile than a simple typewriter. Its real power is that it can change text at any time after it has been entered. If you enter a word wrong, you can correct it without eraser crumbs or unevenly-spaced letters. You can even shuffle paragraphs and delete lines without having to retype the text!

Tex-Scribe (the nickname for this text editor computer program) lets you enter,

#### Table #1

- 1. **DELETE A LINE** of text from the file in memory.
- 2. **INSERT A LINE** of text into the file in memory.
- 3. **REPLACE A LINE** of text in the file in memory.
- 4. **CLEAR** the **FILE** work space in memory.
- 5. **ADD LINES** of text to the end of the file in memory.
- 6. **SAVE** the **FILE** in memory to cassette or diskette.
- 7. **LIST** the **FILE** as it is stored in memory to screen or printer. (This allows you to view all the special non-printable characters like those shown in table 3.)
- 8. **LOAD** a **FILE** from cassette or diskette.
- 9. **REPLACE** a **STRING** of characters in the file in memory.
- 0. **PRINT** the **TEXT** of the file in memory in final form on the printer.

save, retrieve, and print text using the TI Home Computer system. It is written in TI Extended BASIC and will work with both versions currently available. It is not recommended for use with the old TI-99/4 because it was designed around the keyboard features of the TI-99/4A.

#### What Do I Need to Use Tex-Scribe?

For greatest flexibility, I recommend the following configuration:

TI-99/4A Home Computer console TI Extended BASIC Command Cartridge

Color Monitor

TI Peripheral Expansion Box

TI Disk Drive Controller Card Disk Drive (one or more)

TI 32K Memory Expansion Card

TI RS232 Interface Card TI 99/4 Impact Printer

With this setup, you can put Tex-Scribe in the DSK1.LOAD disk file. Than it will automatically LOAD and RUN when you select TI Extended BASIC. This system configuration allows you to keep about 150 eighty-character lines in memory at one time.

The minimum system that Tex-Scribe will work with is:

TI-99/4A Home Computer console

TI Extended BASIC Command Cartridge

TV set and the RF Modulator Cassette recorder

TI Thermal Printer

This second configuration severely limits the practical usage of the program, but it will work.

The Tex-Scribe program listing is set up for the TI-99/4 Impact Printer. If you have a different printer or if your printer is set up differently, you may have to change the lines that are bounded by "REM \$\$\$\$\$..." statements. Tex-Scribe presently *talks to* printer device name "RS232.DA = 8.BA = 9600".

If you are using the TI-99/4 Impact Printer, Table 2 is a handy reference for controlling some of the most popular print modes. If you have a different printer, you will need to refer to its manual.

#### What Can Tex-Scribe Do?

There are ten main commands listed in Table #1. When Tex-Scribe is ready for your command selection, the prompt ACTION? appears on the TI-99/4A screen. Then you may select a specific command by pressing its corresponding number key followed by the ENTER key.

Because Tex-Scribe only displays the command list when first RUN and when an illegal selection is made, you will find it useful to cut out Figure 1 and tape it just above the number keys on your TI-99/4A console.

Then, by glancing at the labels over the number keys, your choice is clear for responding to the ACTION? prompt.

Before describing each command's usage in detail, here is a summary of Tex-Scribe's other capabilities.

To Forgive and Not Forget

Tex-Scribe will not die if you over-stuff the computer's memory with text, leave a disk out of the disk drive, or make some other type of normally fatal error. It recovers and gives you a second chance. However it cannot survive the mistake of using the QUIT command. . .

Continued on p. 16

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## Managing a Mailing List the Futura Way:



"The Program displays

screen, the cursor in one of

in each box so that you can

distribute your information."

wander among them and

them. It tells you what to put

nice lined boxes on the

Anyone who has used TI's Mailing List programs has experienced the utter frustration of waiting and waiting for the program to condense a few hundred names, to sort them by Zip code, and to find a name. In addition, to locate a name it had to be spelled exactly as entered in the computer some months before. If that sounds easy, just try to remember the exact spelling of Zbigniew Morasczewski.

But rejoice! There is a "new kid on the block" who knows what he is doing. Charles Ehninger of Futura Software, P. O. Box 5581, Fort Worth, TX, 76108, has written a superb Mailing List program in Extended BASIC. Much faster than anything you have seen before, it sells for \$49.95 and is worth every cent.

His programs require a Memory Expansion and at least one disk drive. Two disk drives are much better, of course,

but one will do if you don't mind changing diskettes often. Of course, you will also need some sort of printer for your addresses in label and/or report form. Mr. Ehninger tells me the TI-810 printer is ideal, but I have had good results with the Epson MX-80, the IDS 440 Paper Tiger and even with the Olympia ES-100-R0 electronic typewriter that sports an RS-232 interface.

In the Beginning. . .

When you insert the diskette and select Extended BASIC, the MENU program loads automatically. It offers 11 choices, 1 through 9, plus A and B. But before you are given the menu, you have to sit through something rather boring—the title screen. I would have left it out of this otherwise excellent program. But, as consolation, the title appears only when you fire up the system; by the time you have poured your first cup of coffee, it mercifully has disappeared from the screen for the rest of the day.

The first item you have to select from the menu—you do that only once—is the COMPUTER ENVIRONMENT. This allows us to describe our computer system for the program, i.e. type of printer, number of disk drives, and so on.

Your next choice, without a doubt, is FILE MAIN-TENANCE. This program allows you to initialize your data diskette files, set up the various classes and, later perhaps, to add, delete or change classes. Initializing a data diskette requires a little patience—six minutes to be exact. Meanwhile the screen entertains you by displaying the number of the current record being initialized.

**Updating Your Name File** 

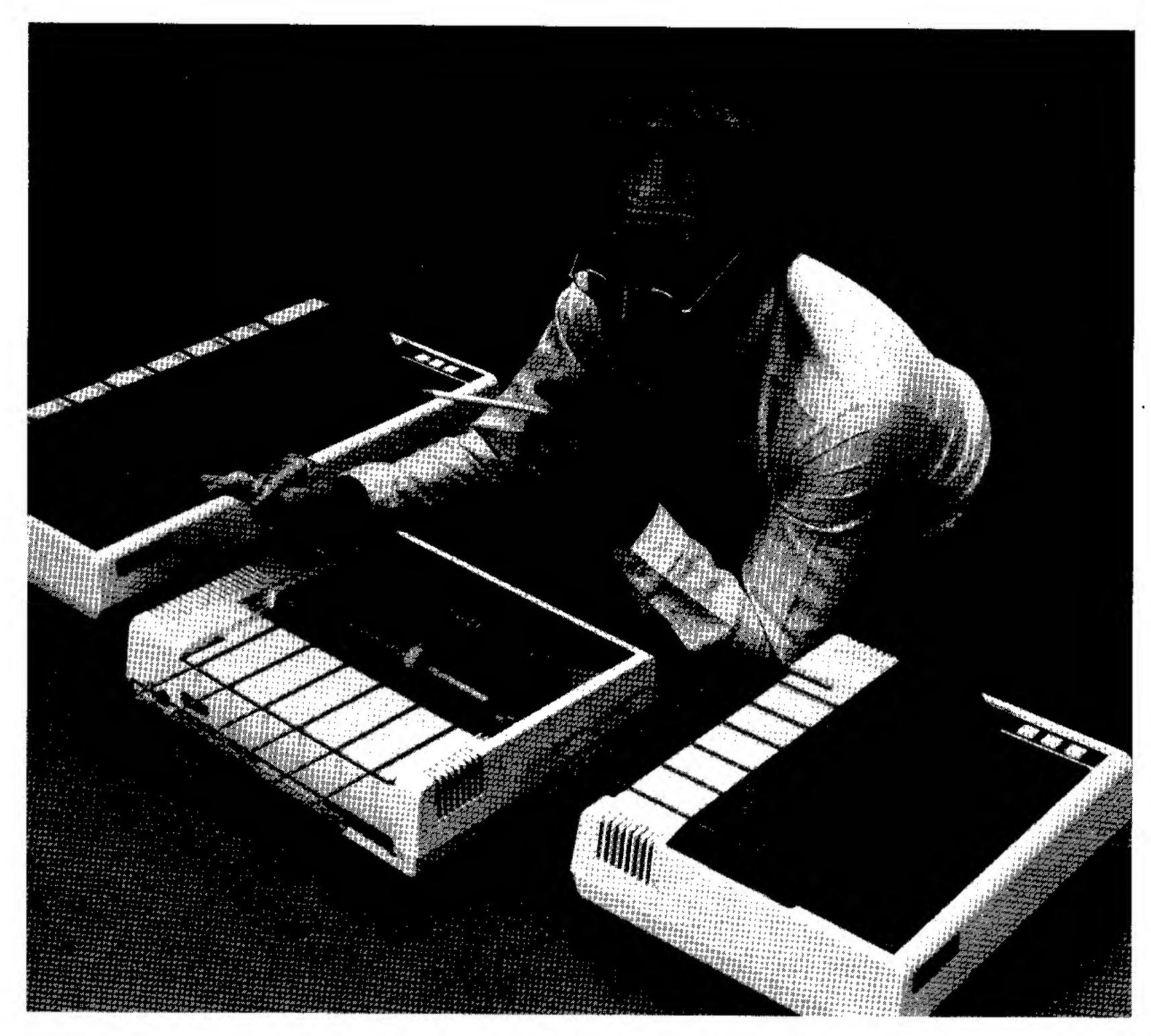
Next on your list you will want to select ADD/CHANGE/DELETE/LOOKUP. As the name implies, you

may now enter (add) new names and addresses, change existing ones, delete some of them or look them up. Now, this part is real fun to do. In reality it is sheer delight. The program displays nice lined boxes on the screen and the cursor in one of them. It tells you what to put in each box so you can wander among them and distribute your information.

Personally, I like order. I would have lots of trouble driving on the highway if it

weren't for the white lines in the middle. They make for a kind of constant pat on the back, saying "You are doing alright, old boy. Just keep on." The same can be said for the boxes. You know exactly where you stand and how much information you may put in each box. If you try to exceed the limits (yes, I will try that too, once in a while) a gentle, but firm semi-raspberry tone will nudge you back where you belong. Now, that is what I mean by order.

Continued on p. 36



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like programmable form length, horizontal tab and right margin; software printer reset; true backspace; and a bidirectional, logic seeking, disposable print head. And the choice, which includes the world's best selling printer, the MX-80, the MX-80 F/T with both friction and tractor paper feed, and the 136-column MX-100. And the reliability rate, which is over 98%.

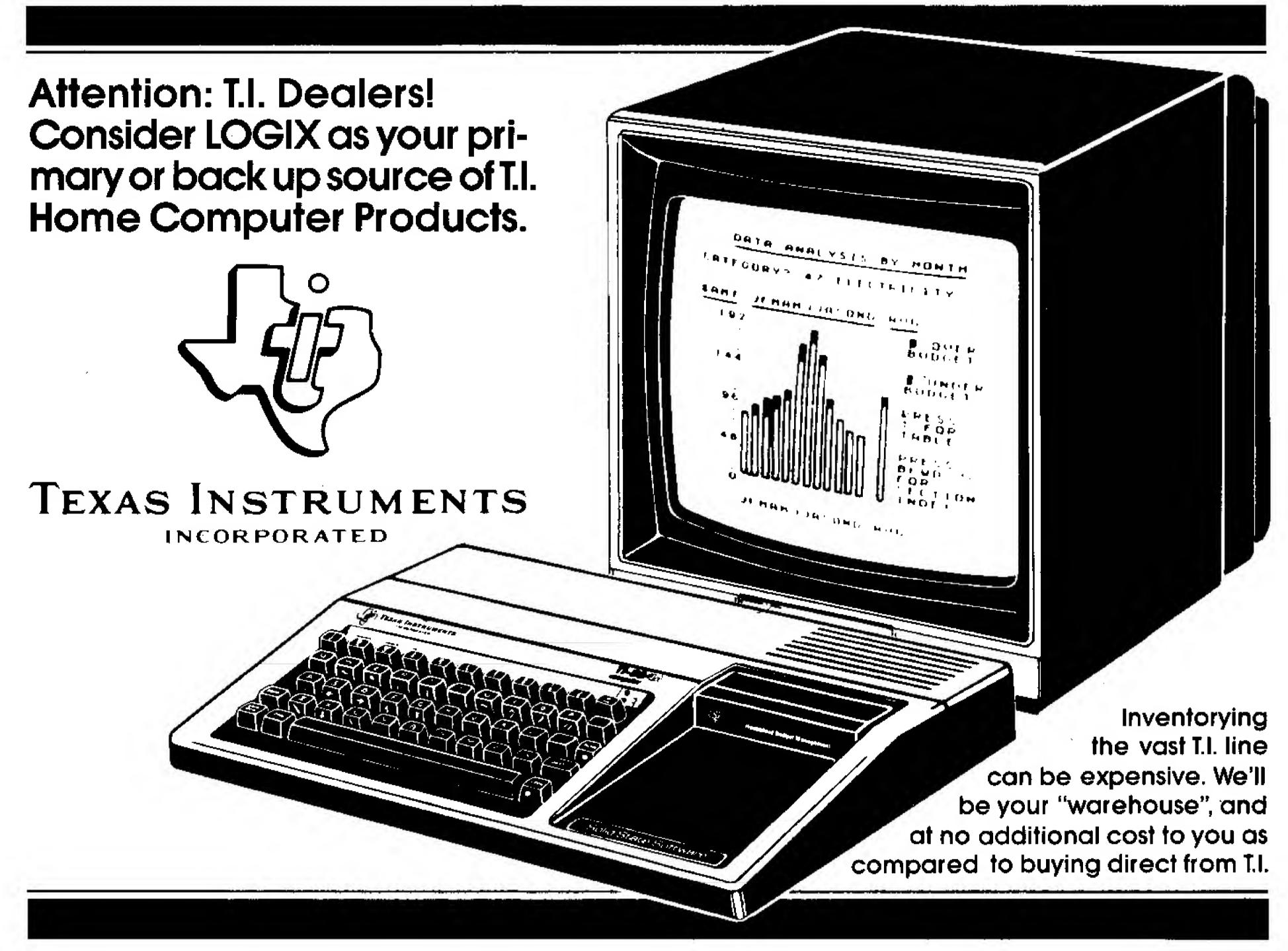
Finally, they looked at the price. And they smiled.

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#### By Steve Davis

4232 Rawlins #101 Dallas, TX 75219

Twas the night before Christmas. The same OLD Routine. Just waiting for something To come on the Screen.

My programs were Loaded From tape with great care. In the hopes that when RUN There would be no Error.

In a CALL SOUND Routine There arose such a clatter, I typed in a BREAK to see What was the matter.

I then han a LIST,

I was checking it slow,

Found not a GO TO,

But instead a TO GO.

When what to my wondering Eyes should appear.
But 8 K of Memory.
Give or take a Byte here.

With a brand NEW program
That ran oh so quick.
I knew it was written by
Jolly St. Nick.

More rapid than Memory
His Cursons they came;
In a SOUND Subroutine.
He CALLed them by name:

"On Floppy, On FOR-NEXT, Now Cassette and Printer, On RANDOM, on COSine. Let's go while it's winter."

To the top of the screen
They Scrolled at his CALL,
"Now DISPLAY, Now DISPLAY,
Now DISPLAY, you all!"

He wrote not a word,
But went straight to his work
Of DISPLAYing graphics
Without any jerle.

And when I hit ENTER,
That dear little man
Paused and played Trek Wars
As only he can.

Then he ENDed the program. Packed up his Print-Out. And as the screen CLEARed. I thought I would shout.

But I heard him REMark As he flew like a Sprite.
"Merry Christmas to all,
And to all a good BYE!"

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#### Tex-Schibe ... from p.9

#### You Set the Line Length

You are allowed to set the number of characters per line when Tex-Scribe is first started, after a LOAD FILE command, and after an illegal response to the ACTION? prompt.

For cassette storage, the maximum line length is 192 characters; for diskette storage, the maximum is 254 characters. The default line length is set to 80 characters.

If you exceed the limit that you have chosen when entering a line of text, Tex-Scribe will truncate the line back to the nearest full word and display the result.

#### **Build Documents**

You can merge several short files of text into memory by using selection number 8, LOAD FILE. This allows you to, for example, build a letter by loading a *letterhead* disk/cassette file, entering text directly from the keyboard, and merging a standard *closing* disk/cassette file.

**Re-Arrange Paragraphs** 

Tex-Scribe's SAVE FILE command lets you save any range of text lines from memory to storage. You can move paragraphs in the text by using these partial file SAVEs to *separate* disk/cassette files (clearing the memory) and then remerging them (using LOAD FILE) into memory in the new order.

#### **Printer Controls**

The TI-99/4A CTRL key can be used to generate the special command sequences needed to cause printers like the new TI-99/4 Impact Printer to do its neat tricks, such as emphasized or italics printing (see Tables 2 and 3).

#### Using the Tex-Scribe Functions

Let's suppose that you have loaded the program from either the 99'er

Magazine-On-Tape cassette or through painstaking keyboard entry. If you have a disk system, you may save the program on a file called DSK1.LOAD. Once you have created this disk file, turn off the console, wait a few seconds and then turn it back on. Now select Extended BASIC and wait patiently for the program to start automatically (about 45 seconds).

The Tex-Scribe *menu* of commands should now show on the screen along with the line-length-setting question. For now, we will just press ENTER to accept the default length of 80 characters. After a slight pause, the ACTION? prompt appears.

Let's start building a text file. Do this by selecting the ADD L!NES command—Press the number 5 key, then press ENTER.

Now we are ready to type lines of text into the file. Make a note of what you see on the screen. The only way to leave this ADD LINES command is by typing two up-arrows ( $\Lambda\Lambda$ ) on a line by themselves, followed by ENTER.

In this command you can make changes only to the line you are currently entering. To make changes to a line previously entered you must get out of this command and use another command (DELETE A LINE, REPLACE A LINE, or REPLACE STRING).

Type in the following line:

The dog chased the cat up the big oak tree in the yard only to find that the cat could reach the roof of the house.

Now press ENTER. Because the line was longer than the 80 character length specified, Tex-Scribe truncated and redisplayed the line for you. Now you may enter the rest of the sentence on line two and press ENTER. On line three just enter the two up-arrows (\Lambda\Lambda) and press ENTER. Now we have something to work with in the memory.

Enter a 2 in response to the ACTION? prompt, for the INSERT A LINE command. Insert a line before line one. Enter anything you like here and note that after the new line is entered, the line numbers in memory are resequenced. The new line is now line one, the old line one is now line two, etc.

Next, say that we made a mistake in our text. We really wanted to say "pink rat" everywhere we said "cat." Press number 9, the REPLACE STRING command. Enter "cat" for the string to replace. Enter "pink rat" for the new string. Before the search is started, you are asked the range of lines to look at for the string "cat". Select "0" to have all lines searched. At the first occurence of "cat" in any line, the string "pink rat" is substituted. Each modified line shows on the screen.

Notice that on the end of each line are the characters LFCR? The LF stands for *line feed* and the CR stands for *carriage return*. Tex-Scribe always converts any *non-printable* characters (which are usually control codes to the printer) to mnemonics when it displays the line to the screen or in response to a LIST FILE command to the screen or printer.

Speaking of LIST FILE, select number 7 and list all the text in memory to the printer. Notice that the line numbers and non-printable characters are there in addition to the text you entered. This command is used to guide you through text modifications; it shows you exactly what is in the memory. This command allows you to select the range of lines to list; once again, "O" will cause all lines to be selected.

Select command number 6, SAVE FILE and choose your storage device. If it is the disk, store the text into disk file JUNK. Now you are safe. If you desire, you may turn off the power and continue tomorrow.

Select CLEAR FILE command (number 4) which erases the text in the memory.

Table 2 — TI-99/4 Impact Printer — Mode Commands	MNEMONIC	99/4A KEY SEQUENCE DEFINITION  hold CTRL&letter G Ring bell (or beep)
HOLD + PRESS then PRESS for FUNCTION  ETRL O Set 16.5 cpi mode CTRL R Cancels 16.5 cpi mode CTRL T Cancels 5 cpi mode CTRL 4 Sets the ITALICS mode CTRL 5 Cancels the ITALICS mode CTRL 6 Sets the emphasized mode CTRL 6 Sets the emphasized mode CTRL 7 Cancels the emphasized mode CTRL 6 Sets the double strike mode CTRL 6 Sets the double strike mode CTRL 6 Cancels the double strike mode	HT LF VT FF CR SO SI DLE DC1 DC2	hold CTRL&letter G Ring bell (or beep) hold CTRL&letter H Backspace hold CTRL&letter L Horizontal tabulation hold CTRL&letter K Vertical tabulation hold CTRL&letter K Form feed hold CTRL&letter M Carriage return hold CTRL&letter N Shift out hold CTRL&letter O Shift in hold CTRL&letter P Data link escape hold CTRL&letter Q Device control 1 (X-ON) hold CTRL&letter R Device control 2
Table 3  Non-Printable Character Definitions  MNEMONIC 99/4A KEY SEQUENCE DEFINITION  SOH hold CTRL&letter A Start of heading STX hold CTRL&letter B Start of text ETX hold CTRL&letter C End of text Hold CTRL&letter D End of transmission ENO hold CTRL&letter E Enquiry ACK hold CTRL&letter F Acknowledge	DC3 DC4 NAK SYN ETB CAN EM SUB EXC FS GS RS US	hold CTRL&letter T Device control 3 (X-OFF) hold CTRL&letter U Negative acknowledge hold CTRL&letter V Synchronous idle hold CTRL&letter W End of transmission block hold CTRL&letter X Cancel hold CTRL&letter Y End of medium hold CTRL&letter Z Substitute hold CTRL&''' Escape hold CTRL & ''' Escape hold CTRL & ''' Group separator hold CTRL&number 8 Record separator hold CTRL&number 9 Unit separator

DELETE INSERT REPLACE CLEAR ADD SAVE LIST LOAD REPLACE PRINT.
A LINE A LINE A LINE FILE LINES FILE FILE STRING TEXT.

Try LIST FILE to the screen now . . . As you can see the memory is empty.

Because the memory is empty, this is a good time to try the LOAD FILE command. Select number 8 and the device you are using for storage. If it is the disk system, load from the JUNK file. After loading, you are again asked to choose the length of line. Complete that task, and select the LOAD FILE command one more time. Now Tex-Scribe gives you a warning. Because you already have something in memory, you have a chance to CLEAR the FILE or MERGE a FILE from disk (or cassette) with the lines

already in memory. Select "M" for MERGE and continue to load the JUNK file again.

Let's PRINT TEXT to see what is in the memory now. Select number 0. This command prints faster than the listing function because Tex-Scribe doesn't have to slow down for translation of the non-printable characters. Use this command to print the final results of all your text editing.

Select number 1 for the DELETE A LINE command. When asked, select a line to delete. Use LIST FILE to list the memory to the printer again. Note that

the file is resequenced without the deleted line.

The only command not yet tried is number 3, REPLACE A LINE. Go ahead and select it. Have you noticed that the screen turns red when you select a command that modifies text? That is to keep you awake during such modifications! Type in a replacement for line 3. Now PRINT TEXT to the printer to see the difference.

Well, that's the course. You now have a simple, modern wordsmith's tool kit at your disposal. The more you use it, the more useful it becomes.

qq<sub>er</sub>

			**************************************
	EXPLANATION OF THE PROGRAM	1730-1820	Set up output file, and initialize printer.
	Tex-Scribe	1830-1870	Print file records.
Line Nos.	•	1880-1930	Restore printer to normal.
100-180	Rem's: title, and version.	1940-2200	Load or merge file from storage device.
190	Disable sprites. To be used only with expan-	2210-2530	Subroutine to replace a string within the file
	sion memory.	2540-2730	Print text from the file to the printer.
200-320	Initialize variables.	2740-2880	Format source file for output.
330-390	Reset printer.	2890-3020	Input file from keyboard.
400-460	Initialize variables.	3030-3150	Locate line from file and display on the
470-560	Display menu screen.		screen.
570-660	Enter command, and branch to subroutines.	3160-3350	Subroutine to set the range on the file.
670-810	Delete line subroutine.	3360-3440	Subroutine to load a file from cassette.
820-1000	Insert line subroutine.	3450-3530	Subroutine to save a file to cassette.
1010-1150		3540-3640	Subroutine to load a file from disk.
1160-1220		3650-3740	Subroutine to save a file to disk
1230-1370		3750-3890	Disk file select subroutine.
1380-1570		3900-4040	Error handling and recovery subroutine.
1580-1720			

1160-1220 Clear file in memory.
1230-1370 Add lines to file.
1380-1570 Save file to storage device.
1580-1720 List file subroutine controle
1500 1720 Dist the subtoutine controle
<u></u>
100 REM ************
110 REM * TEX-SCRIBE *
120 REM # BY #
130 REM * DAVID G. BRADER *
140 REM *************
150 REM 99'ER VERSION 2.2.1XB
160 REM
170 REM INITIALIZATION OF SCRIB
] E
180 REM KILL SPRITES (FOR SPEED
185 REM ****** DELETE LINE 190 IF
YOU DO NOT HAVE 32K MEM. EXPAN
SION. ******
190 CALL INIT :: CALL LOAD (-31878,0
)
200 REM
210 OPTION BASE 1
220 REM
230 DIM A\$(200),C\$(31)
240 REM
250 REM DATA FOR COMMAND LOOKU
P TABLE
260 REM
270 DATA NUL, SOH, STX, ETX, EOT, ENG, AC
K, BEL, BS, HT, LF, VT, FF, CR, SO, SI, D
LE, DC1, DC2, DC3, DC4
280 DATA NAK, SYN, ETB, CAN, EM, SUB, ESC
,FS,GS,RS,US 290 REM
300 FOR I=1 TO 31
310 READ C\$(I)
320 NEXT I
330 REM
340 REM \$\$\$\$\$ NOTE THAT STATEMENTS
BRACKETED BY DOLLAR SIGN REM
350 REM \$\$\$\$\$ STATEMENTS, MAY REQU
IRE MODIFICATION FOR YOUR PRINT
ER.
360 REM

	370	REM \$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$
		\$
j		5555
١	380	RESET@EPSON\$=CHR\$(18)&CHR\$(20)&
١		CHR\$ (27) &CHR\$ (70) &CHR\$ (27) &CHR\$
		(72)&CHR\$(13)&CHR\$(27)&"5"
	390	REM \$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$
١		555555555555555555555555555555
١		55555
	400	LFCR\$=CHR\$(10)&CHR\$(13)
1	410	WIDTH=80
	420	REM
	430	CALL CLEAR
		CALL SCREEN(16)
ļ		REM
•		MEM\$="<<< SORRY, MEMORY FULL >>
	100	>"
	470	REM MENU
	480	
		CALL CLEAR
		DISPLAY AT(3,1):" *** TEX-
	500	SCRIBE *** Command fu
		nctions"
ļ	510	DISPLAY AT(7,1):"1-Delete 2-Ins
	010	ert 3-Replace a line a line
		a line"
	520	
		DISPLAY AT(10,1):"4~Clear 5- A dd 6~Save file line
		s file"
	530	DISPLAY AT(13,1):"7-List B-Lo
	333	ad 9-Replace file file
		a string"
	540	DISPLAY AT(16,1):"Q-Print the t
	340	ext of file"
	550	DISPLAY AT (20, 1): "HOW MANY CHAR
	220	<u>.</u>
		ACTERS PER LINE DO YOU WANT
	E/^	?";WIDTH
	260	ACCEPT AT (21,19) VALIDATE (DIGIT)
		SIZE(-3): WIDTH
	2/0	IF (WIDTH<1)OR(WIDTH>254)THEN 5
		50

iandl	ing and recovery subroutine.
580	PRINT
590	ON ERROR 3920 :: CALL SCREEN(16
	):: INPUT "ACTION ? ":M
	IF M=-1 THEN 4040 :: M=M+1
610	IF (M<1)+(M>10)=-1 THEN 620 ELS
	E 640
620	CALL CLEAR :: CALL SCREEN(12)::
	DISPLAY AT(1,1):" <<<< SELECTI
,	ON ERROR >>>>"
	GOTO 500
640	ON M GOSUB 2540,670,820,1010,11
/ SE ^	60,1230,1380,1580,1940,2210
020	CALL SCREEN(4):: IF M=9 THEN CA
4.10	LL CLEAR :: 60TO 550
	GOTO 580
680	REM DELETE A LINE
	_
	CALL SCREEN(10)
	IF LOO THEN 730
	PRINT :" *** FILE EMPTY ***":
	60TO 810 60SUB 3030
	IF B±0 THEN B10
	L=L-1
	FOR I=8 TO L
	A\$(I)=A\$(I+1)
	NEXT I
	A\$(L+1)=""
-	PRINT : "Deleted, file renumbere
- <b>-</b>	d":
B10	RETURN
820	REM INSERT A LINE
830	REM
840	CALL SCREEN(16)
850	IF L>O THEN BBO
860	PRINT :" *** FILE EMPTY ***":
870	GOTO 1000
880	PRINT : "Insert before"
B <b>9</b> 0	GOSUB 3030
	IF 8=0 THEN 1000
910	PRINT: "Enter new line."
	Continued on p. 52

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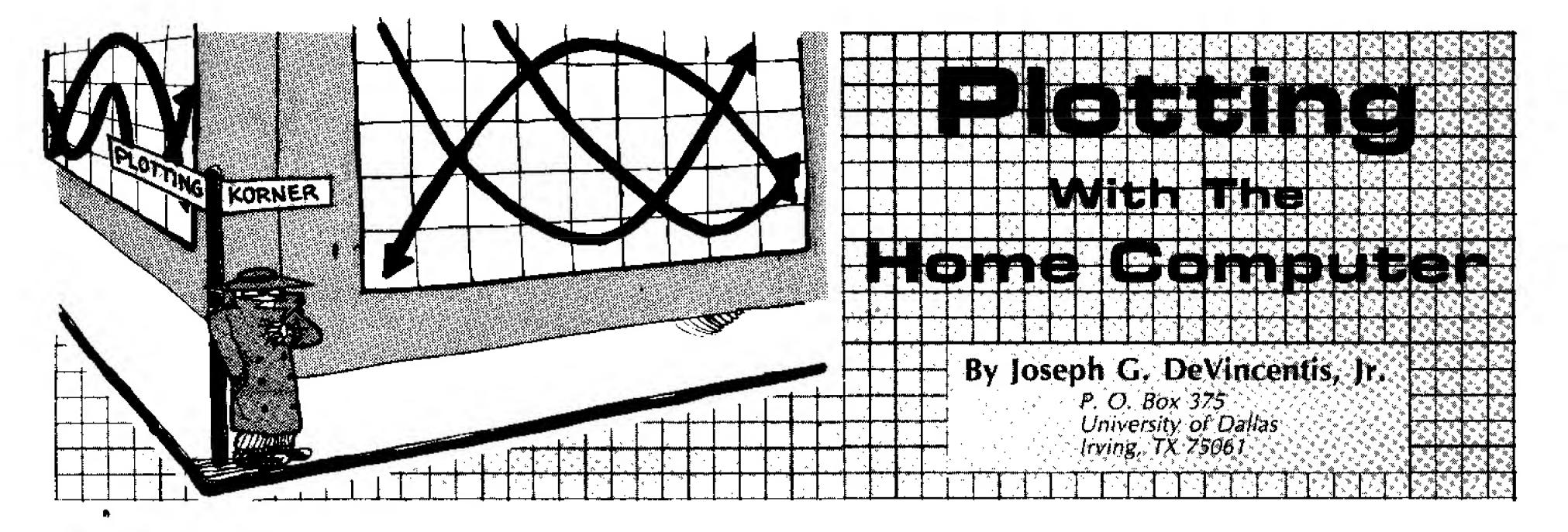
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he Assembly Language routines presented in this article will let Home Computer users draw axes, plot curves, and even draw objects in perspective. The software, consisting of plotting routines for the Mini Memory Cartridge, accesses the powerful graphics capabilities of the TI-99/4A through TI BASIC.

The routines supplied in this package require either of the following peripheral configurations:

- I. Memory Expansion, cassette recorder, Mini-Memory, and assembled (object file) routines available on this issue's "99'er Magazine-On-Tape." [See page 69]
- 2. Memory Expansion, disk system, Mini-Memory, Editor/Assembler, and source files (hand entered from listings included with this article.)

**Note:** The large size of these subroutines, and the fact that part of Mini-Memory is required for the Line-by-Line Assembler, dictates that the *source* files be assembled via the Editor/Assembler rather than the Line-by-Line Assembler that comes with the Mini-Memory. We are therefore making the *object* file available on tape so that readers without an Editor/Assembler and disk system can take advantage of this powerful software—Ed.

#### Theory of Operation

The routines work on the basis of a plotter. The screen is the plotter's surface, and the routines control an imaginary "pen." The pen can be moved with or without drawing a line on the screen, and if it tries to draw off the screen, it

will change no data other than the position of the pen.

The resolution of the screen is 192 pixels (dots) vertically and 256 horizontally. The routines allow you to clear the screen, scale the screen, draw X and Y axes, output text, change the pen's position and draw lines. Because the routines take advantage of the advanced graphics mode of the TMS9918A Video Display Processor (VDP), compromises had to be made (due to memory requirements in this mode).

The VDP takes up 12K bytes of space in VDP RAM to define the shape and color of the characters. This leaves very little room for BASIC programs. Therefore, a buffer was created in the Memory Expansion to keep the character shape table. Because this buffer is not in the VDP RAM, the plot cannot be seen until the GRAPH command is issued. Also, once this command is issued, the BASIC program will be destroyed. Therefore, it is advisable to save your BASIC programs before running them!

As a positive side effect, after the plot is put on the screen and the user returns to the power-up screen (by pressing the Q key), the plot will remain unchanged in the Memory Expansion Buffer. The plot will exist as long as the user does not issue the GCLEAR

command or turn off power to the console or the Memory Expansion. Therefore, it is possible to add data to a plot even after looking at it several times.

The line-drawing algorithm is based on Bresenham's algorithm described in *Principles of Interactive Graphics* by William M. Newman and Robert F. Sproull (McGraw-Hill Book Company). The algorithm was originally designed for control of a digital plotter but is easily adapted to the type of display used on the 99/4A. For a complete discussion of this algorithm, refer to pages 25 and 26 of the book mentioned.

Within the line-drawing routine of the package, A and DELTAA refer to the axis of greatest movement. X and Y keep track of the pen's current position and can only be changed by using the DRAW and MOVE commands. Bresenham's algorithm covers the remainder of the DRAW routine.

#### **Descriptions of Plotting Routines**

The routines may be used either as program statements or as interactive commands (hereafter, the term *command* will refer to the statement as either a program statement or an interactive command).

The graphic capabilities are unique to the Video Display Processor (VDP) in the 99/4A. However, if the VDP in a 99/4 is changed from a TMS9918 to a TMS9918A (the chip in a 99/4A), these routines are also usable with the 99/4. The TMS9918 and TMS9918A are pin compatible and any software designed for the 99/4 will run with the new chip in place, with no modifications. [This chip swapping should only be done by a competent technician—Ed.]

#### **GCLEAR**

This routine initializes the graphics package. The plotter surface is cleared and the pen is set for the lower left-most pixel. The scale is set such that the X axis has a minimum value of zero and the maximum value is 255. The Y axis has a minimum value of zero and the

maximum of 191. The lower left hand pixel has the coordinate value of (0,0). The TI BASIC syntax is:

CALL LINK("GCLEAR")

There are no parameters passed with this command.

#### **SCALE**

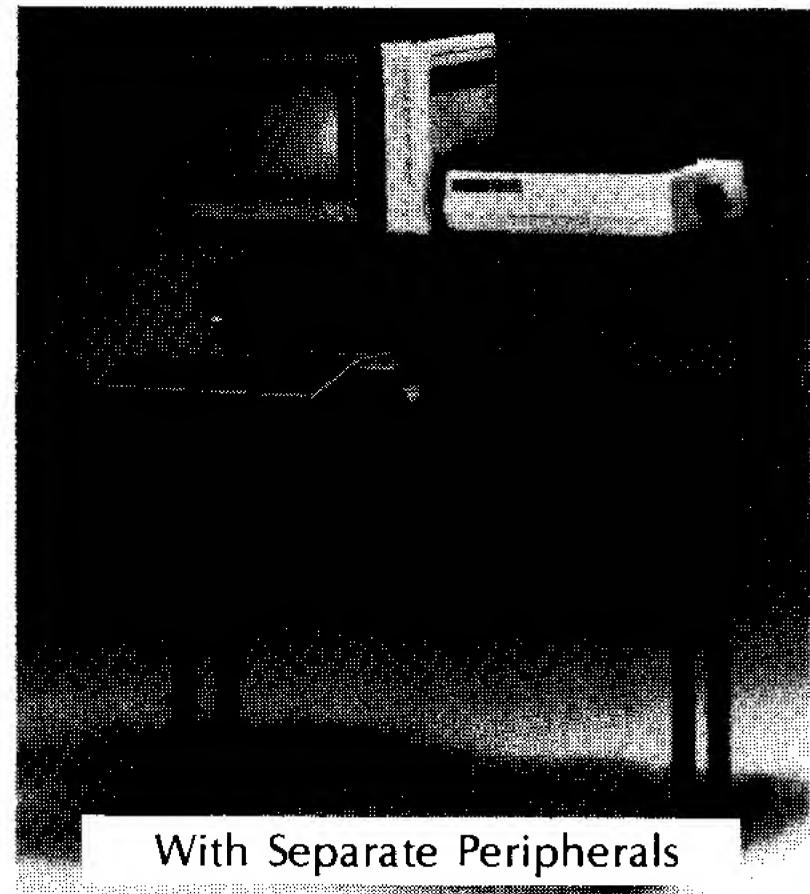
The SCALE command lets you set the minimum and maximum values of the screen. These values can be real or integer. They may be passed as either numeric expressions or as numeric variables. The minimum *must* be less than the maximum, otherwise, a \*BAD ARGUMENT IN . . . type error will be issued. The TI BASIC syntax is:

CALL LINK("SCALE", Xmin, Xmax, Ymin, Ymax)

The variables may *not* be passed through numeric arrays. The routines do not support arrays at this time. The scaling of the screen may be changed at any time without affecting the data which is already in the screen buffer. When the SCALE command is used, the absolute position of the pen on the screen is not changed. For example, if the pen were in the lower left hand corner of the screen and the scaling were changed, the position of the pen

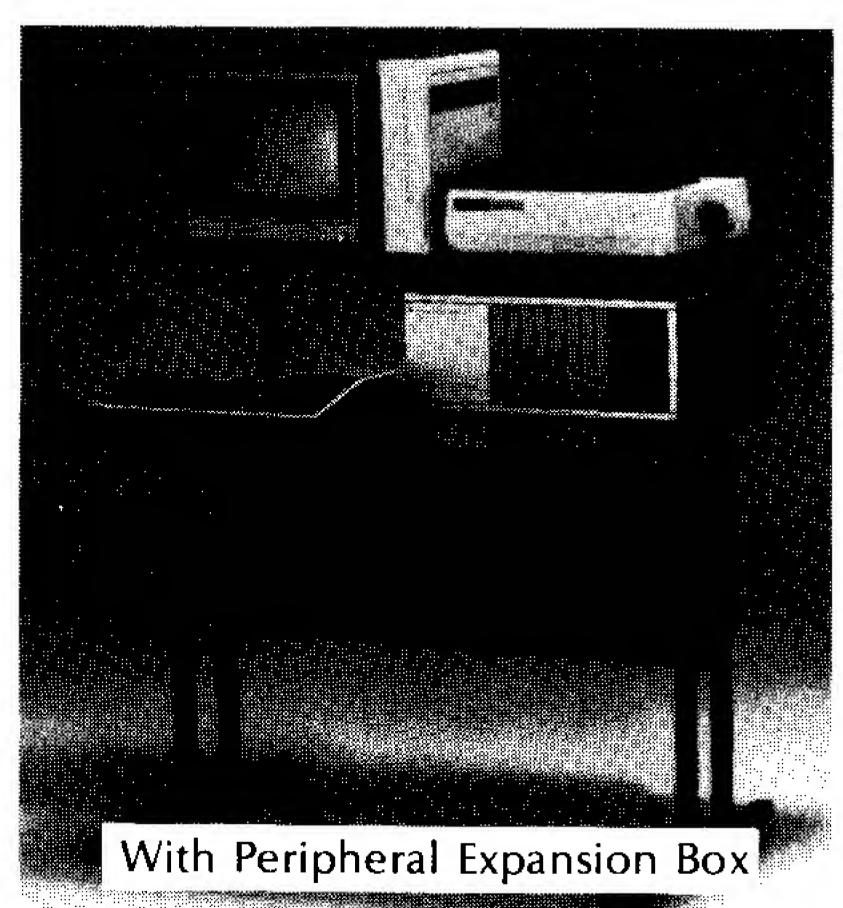
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would still be in the lower left-hand corner, no matter what the new scaling.

#### **DRAW**

The DRAW command will move the pen from its current location to another point, specified by the user. Since the routine keeps track of the current pen position, all that is necessary is to specify the point to which the pen is to DRAW. The DRAW command is used as follows:

CALL LINK("DRAW", Xposition, Yposition)

The restrictions and freedoms of the parameters for this command are the same as those for the SCALE command. The X and Y positions are the coordinate values of the destination point for the pen. If the position specified is off the screen, the pen will move off the screen, but will only draw the line to the edge of the screen. Although there is no risk of destroying data by drawing off the screen, there are dangers of numeric overflow.

#### MOVE

This routine performs the same function as the DRAW command, except that the pen is "lifted" before being moved and therefore draws no line. The pen is put back down after reaching its new location. The TI BASIC syntax is:

CALL LINK("MOVE", Xposition, Yposition)

The parameters are the same as the DRAW command.

#### **XAXIS**

This command draws a horizontal axis specified by a minimum and maximum along the X axis. The axis will intersect the Y axis at a user specified point. The position of the pen will remain unchanged. Use of this command is as follows:

CALL LINK("XAXIS", Xmin, Xmax, Yintercept)

The parameters may be either numeric expressions or variables. Again, array elements are not allowed.

#### **YAXIS**

This command is the Y axis counterpart to the XAXIS command. The TI BASIC syntax is:

CALL LINK("YAXIS", Ymin, Ymax, Xintercept)

#### **LABEL**

This command allows the user to output text to the screen, and is capable of outputting the ASCII characters, including upper and lower case. All characters with an ASCII value of less than 32 will be made to look like a 32 (space). All characters with a value greater than 127 will be equated to 127. In this case, this is also a space. Due to the nature of character definitions, the characters will be output to the character blocks, starting at the block designated by the current position of the pen. If the string is contained in a string variable (arrays are not allowed), the TI BASIC syntax is as follows:

CALL LINK("LABEL", variable)

If the user wishes to output the string directly, the TI BASIC syntax is:

CALL LINK("LABEL", "string")

#### **GRAPH**

This command is used to bring the plots to the screen. The use of GRAPH destroys any BASIC program in memory—so save your BASIC program before running it. After the command is invoked, the plot generated will appear on the screen. You can leave this mode by pressing the 'Q' key. The power up screen will appear. If the machine is not turned off, you may add to your graph by returning to TI BASIC and running a new program. The TI BASIC syntax is as follows:

CALL LINK("GRAPH")

This routine requires no parameters.

#### Loading the Plotting Routines into Mini-Memory

Once the routine has been loaded into the Mini-Memory, it is not necessary to reload it unless the routine has been destroyed

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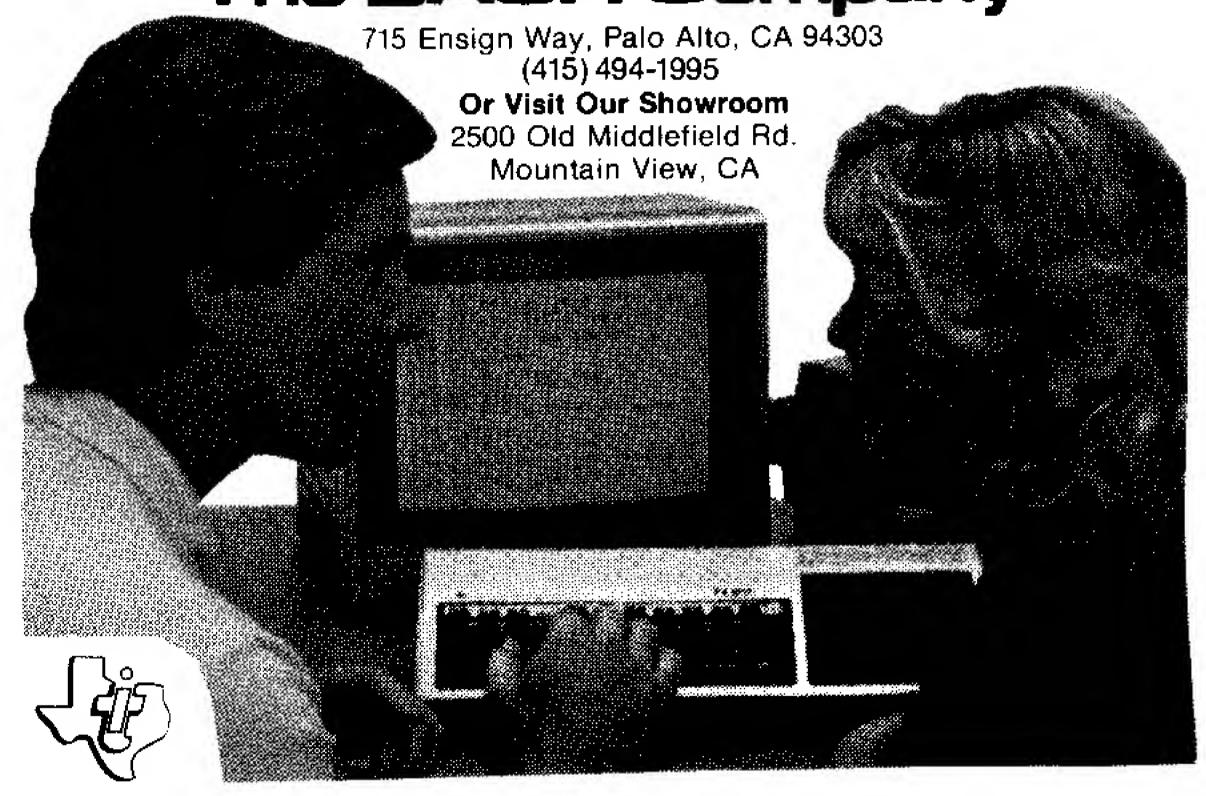
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#### Letters . . . from p. 7

Dear Sir:

In talking to people about the TI-99/4A, the conversation usually turns to the machine's speed. According to the 9900 Family Systems Design and Data Book, the 9900 CPU has a speed of 3.3MHz (page 2-12). Some people believe TI is not as fast as some of the other micros on the market. Let's look at the following piece of code:

10 BO = 27200.00

20 FI = .00666666667

30 PYMT = 209.93

40 NK = 299

50 FOR JS=1 TO NK

60 PI1 = BO\*FI

70 PPR = PYMT - INT(PII\*100. + .501)/100.

80 BO = BO - PPR

90 NEXT JS

100 PRINT BO; PPR; PH

On the 99/4A, it takes about 20 seconds to run. A friend has an APPLE with the Z80 processor installed along with Microsoft BASIC. Using the APPLE BASIC, execution time was about 10 seconds. With Microsoft BASIC, this time lowered

to 8 seconds. In doing further research, it was discovered that the 8 bit processors use 8 digit precision. For a different kind of test, a double precision feature was turned on in Microsoft BASIC. This increased the accuracy to 15 digits. The code was again executed, this time taking 32 seconds to complete. This precision is fixed at 13. digits. This gives a reasonable explanation for TI's "slowness." One other item was noticed; during one of the tests a constant was entered incorrectly. This created an overflow condition on the AP-PLE but the TI chugged on and finally came up with an answer printed in exponential format! For speed, accuracy and flexibility. This number one. Joseph W. Kalinski

Buffalo, NY

Interesting data, Joseph, on TI BASIC. It might be interesting to compare the T. Assembly Language version to the APPLE Assembly Language version . . .

Dear Sir:

I just finished entering the program "Pre-School" Block Letters and Data Compaction" by Howard G. Drake (Vol. 1, No. 6, p. 73) into my TI-99/4A. The program is very useful in illustrating data crunching procedures and its "humanistic" graphics execution should be of value to pre-readers (lintend) to add this program to the curriculum for the 4 and 5 year-olds at a parent coop school here in Davis).

I congratulate the 99'er Magazine for overall excellence and especially for its commitment to educational enrichment of the traditional curriculum of our schools.

> Ratchford Higgins Davis, CA

We plan to have more programs and reviews of the CAI type, Mr. Higgins. As you are aware, the II Home Computer can be a great tool for education.

Dear Sir:

I decided to write a short note of compliment about your magazine before I go back to reading my first issue (Vol. 1, No. 6). It's great to have a magazine that deals only with the TI-99/4A and does not bother with those other "computers."

I especially liked "The Beginner's Guide to Cassette Operation with the Home Computer." Since I've only had my 99/4A since March, I am still a novice programmer. This article cleared up some questions I had on use of a recorder and use of files.

> Peter Donovan Dayton, OH

Thanks, Peter, Thope you continue to find 99 er Magazine the most useful TI Home Computer 'peripheral.''

Dear Sir:

I've recently become a TI-99/4A owner and a subscriber to your terrific magazine. Your magazine is like an oasis in the desert for me. The evolution from first issue to current issue has been terrific. I think you're putting out not just the best TI magazine, but the best hobbyist microcomputer magazine. I would like to see more articles evaluating hardware (both TI and TI compatible), especially disk systems and printers, and more articles on programming tricks and design. But so far my only serious complaint is that 99'er doesn't come often enough.

Mark Magner Mississauga, Ontario, Canada

Our going monthly should take care of your "only. serious complaint." We plan to increase our reviews of both hardware and software. Mark.

Dear Sir:

I thoroughly enjoyed your article "Notes on a Computer Score: Part 2 the TI-99/4 Assists Gifted Children in the Learning Process." It gives me a feeling of satisfaction to see that kids are excited about learning through the use of computers.

Our family got a TI-99/4A for Christmas last year. Hove the "Music Maker" Command Module. Being a pianist, I like to experiment with musical patterns and harmonies. I can compose music easily, without having the mind of Mozart. My piano teacher found the TI concept for teaching, a great asset. " . . . It makes learning fun."

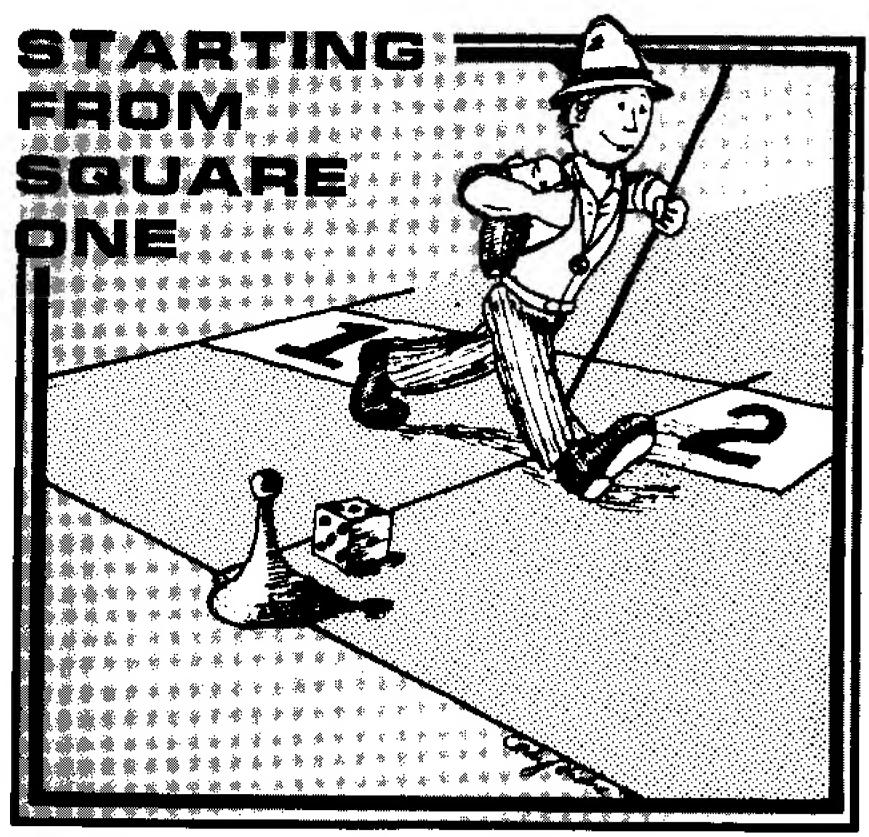
I wish a computer music class could be available. in every school as part of the regular curriculum. It would motivate high school students to learn the basics in computing.

I, personally, am considering pursuing a career in Computer Science.

Being relatively new to computers and anxious to understand new concepts—I find the 99'er Magazine a real help. Thanks for the great job.

Natalie Adams Chesterland, OH

Natalie, you have made an intersting observation one that many might not immediately. comprehend. With CAI, students learn not only the target subject matter, but also the basics of computing. And so, our society advances into the new era.





Sleepy-eyed household members asking what had happened. Forced back to the reality of my surroundings, I realized I had loudly proclaimed my frustration at the message on the screen. The clock showed midnight. Yielding to the needs of others—not to mention my own fatigue—off to bed I went. As I lay there, visions of memory conservation danced in my head. . .

One of the big challenges of writing programs is to stay within the memory capacity of the computer: A large program may not run with the disk controller or other peripherals connected. You'll recognize this situation if while RUNing a program, you hear a horrible "BEEP" and see the MEMORY FULL IN . . . message. The following programming hints will help you to conserve memory.

#### **REMark statements**

REMark statements are valuable while you are developing your program; they keep track of what each section is doing. REMs are also great for others who read your program listing. However, each REM takes up valuable memory—one byte per character plus each digit of the line number. Deleting REMs is the easiest and perhaps first step to reduce the program size.

By the way, when you write a program, avoid GOTO and GOSUB to a REM. Then if you must delete a REM, you won't need to search for all the places where that line number is referenced.

**DIMension wisely** 

Remember that subscripts start with zero unless you use OPTION BASE 1. If you do not use a DIMension statement, TI BASIC automatically reserves eleven elements in each dimension, for example A(10,10,10). If you are using up to A(9, 9, 9) or A(10, 10, 10), it isn't necessary to use:

100 DIM A(10, 10, 10) which takes up 20 bytes. However, if you are running close to full memory

and only need A(6), then use:

100 DIM A(6)

For higher numbers only, DIMension to the subscript you need. For example, if you have a program for a class of 32 students, use:

100 DIM S(31)

rather than arbitrarily using:

100 DIM S(40)

When you RUN the program—even if you don't fill those extra elements—you reserve eight bytes per subscript. Strings don't reserve as much—the element is null until actually filled. Your DIM of a string, when RUN, uses 8 bytes plus 2 times each subscript.

#### Stack Several PRINT Statements

Remember, each separate line number uses more memory. By using colons and spaces, you may print several lines using only one PRINT statement. The colon means "Go to the next screen line," and you may have as many colons as you need.

Keep in mind that a screen line has 28 positions, and you may use spaces appropriately (in quotations) to print several screen lines. The maximum length of a statement is 112 characters including the line number. Examples are:

113 bytes:

300 PRINT

310 PRINT

320 PRINT "THIS STATEMENT SHOWS AN"

330 PRINT "EXAMPLE OF HOW TO COMBINE"

PRINT "SEVERAL LINES OF PRINT."

87 bytes

300 PRINT:: "THIS STATEMENT SHOWS AN": "EXAMPLE OF HOW TO COMBINE SEVERAL LINES OF PRINT."

#### **GOSUB**

Check through your listing and note any repetitious code or sequences of similar statements. Consider using a subroutine and GOSUB for commonly

used program segments. For example, if throughout the program you use the pressing of ENTER to continue after instructions, you may use this subroutine:

200 PRINT "PRESS ENTER TO CONTINUE"

210 CALL KEY(O,K,S)

220 IF K < > 13 THEN 210

230 RETURN

Each place you need this procedure, use GOSUB 200.

You may have a longer procedure with a few variables needing definition before calling the subroutine. For instance, suppose you are drawing two wheels on a car and a man's head—all circles. Specify the necessary coordinates (only those changed since the last use) then GOSUB (300 in this example) to the subroutine that draws the circle:

300 REM Circle Subroutine

400 RETURN

500 X = 20

 $510 \quad Y = 5$ 

520 GOSUB 300

530 Y = 12

540 GOSUB 300

550 X = 4

560 Y = 20

570 GOSUB 300

#### **Limit Variables**

Ordinarily you will want to give your variables meaningful names. If memory is a problem, you may have to give up clarity to get your program to run. Longer names take up more memory.

For each independent loop counter, you may use the same variable name. Rather than using FOR MON = 1 TO 12, FOR NAME = 1 TO 32, FOR COUNT = 1 TO 5, FOR DELAY = 1 TO 500—use *one* short name: FOR 1=1 TO 12, FOR 1=1 TO 32, etc.

#### **Use DATA and READ Statements**

If you have more than eight statements in a row that are doing the same process, you may use a DATA routine instead, making the DATA statements as long as possible. I say eight because depending on the data, it takes seven or eight statements for the DATA routine. For an illustration here, the usual way to define graphics characters is:

400 CALL CHAR(100,"FFFFE7C3C3 E7FFFF")

410 CALL CHAR(101, "F8F8")

420 CALL CHAR(102, "FF00FF") etc.

If you have a large number of characters to define, the procedure can be changed to:

400 RESTORE 450

410 FOR I = 1 TO 10

420 READ C,C\$

430 CALL CHAR(C,C\$)

440 NEXT I

450 DATA 100,FFFFE7C3C3E7FFFF, 101,F8F8,102,FF00FF, etc.

To conserve even more, if the character numbers are in consecutive order, use the loop counter instead of READing C. For example, CALL CHAR(99+1,C\$). Note also that a string variable in a DATA statement does not need quotation marks unless you want leading or trailing spaces. Deleting quotation marks does not decrease the memory, but it does reduce space, so you may fit more on a DATA statement line.

You may use DATA for CALL SOUND statements (READ in any of the parameters that change with each statement), CALL HCHAR, CALL VCHAR (READ x-coordinate, y-coordinate, character number, and repetitions) or with any statements that use numbers or strings that can be READ from DATA A disadvantage of using DATA statements is that it is harder to figure out what a program is doing.

Remember to take advantage of TI's RESTORE, which allows the DATA statements (which may be placed anywhere) to be selected, read and reread.

#### "Scrunch" DATA

Perhaps the best way to explain this is with an example. Suppose you have a football statistics program. One DATA statement includes the player's name and the number of pass interceptions per game for ten games. A dash means he did not play, and an asterisk indicates he was injured. The program segment is:

200 READ LAST\$, FIRST\$

210 FOR I = 1 TO 10

220 READ P1\$

260 NEXT I

with the accompanying DATA for one player:

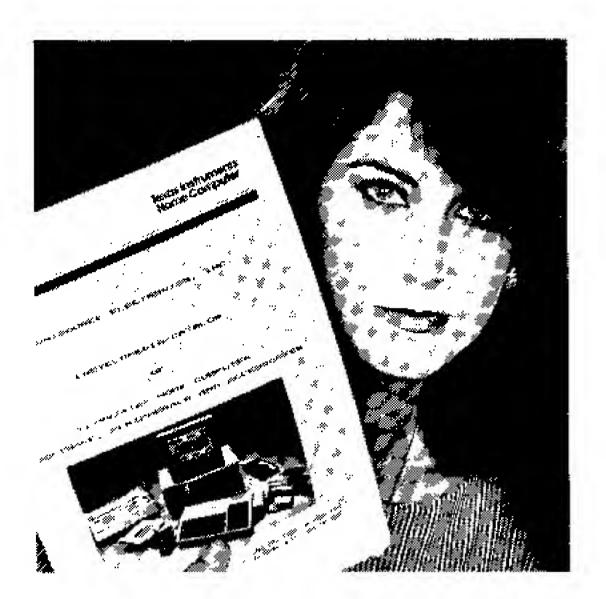
300 DATA DOE, JOHN, -, 0, 1, 3, 0, 0, 2, 3, \*, 3

This DATA statement uses 59 bytes. The bytes may be reduced by leaving out the zeros. This is especially helpful if a DATA statement has a lot of zeros (some of the players intercepted very few passes). Deleting the zero indicates a null string, and the logic in the program would have to include an IF statement to change the Continued on p. 38

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The Digest has just learned that the TI Rebate/Free Speech offer has been extended until April TI OPTS FOR REBATE EXTENSION 15, 1983—a marketing move based on the premise that giving away \$100 checks and free accessory products is presently the most effective strategy for maintaining TI's lead in retail sales.

## GUNS OF NAVARONE FIRE ASSEMBLER TOOL OUT TEXAS WAY

A TI spokesman has just announced the purchase of "Super Bugger" from Navarone Industries of Sunnvale, California. The software consists of an interactive Assembly Language Debugger allowing single-step trace, and advanced program development using a bit-mapped screen, disassembler, and memory dump utility. The product will be disk-based. Future price and availability to be announced. The purchase is significant in that it demonstrates TI support of thirdparty software development by providing the suitable tools.

The remaining bug in Microsoft's implementation of Multiplan (a sophisticated spread sheet tool) MULTIPLAN GETS READY TO SPREAD ITS WINGS for the Home Computer has been fixed by the program's authors. The release of the software to TI's Semiconductor Group for chip manufacture—needed for the master Command Cartridge signifies another marketing coup for TI: As was accomplished with the p-system, the lowest cost hardware/software implementation of a popular micro product has found a strategic place in the Texas stable. Users demanded a "Visicalc," and Lubbock is providing it—only better and cheaper.

October's 99'er TI-Fest in San Francisco provided the birthing place for a brand new multi-level MULTI-LEVEL MARKETING IS MUSHROOMING marketing plan for the TI Home Computer. Scotch Marketing, Inc. (Springfield, MO) signed up several hundred new dealers at the show. Tronics Sales Corporation, the original multi-level Home Computer distributor, was also represented at the show through the recruiting efforts of another exhibitor, the San Francisco-based Personal Computer Association.

## THE TI-CDC PLATO RELATIONSHIP IS NO LONGER ALL GREEK

A series of Control Data Corporation (CDC) ads have recently been promoting their Plato courseware for three popular microcomputers, the TI-99/4A included. Under an agreement with CDC, TI took the "pick of the litter"—the 500+ programs (organized as 108 software packages) in Basic Skills and High School Skills that have the most impact for home and educational institutions. CDC gets to market the rest to TI users directly. The Plato implementation on the TI machine is the most comprehensive set of CAI ever done on a micro. A student who successfully completes the High School Skills courseware is supposed to be able to pass a high school GED test.

## TI FORTH TO USHER IN THIRD WAVE OF HOME COMPUTER SOFTWARE

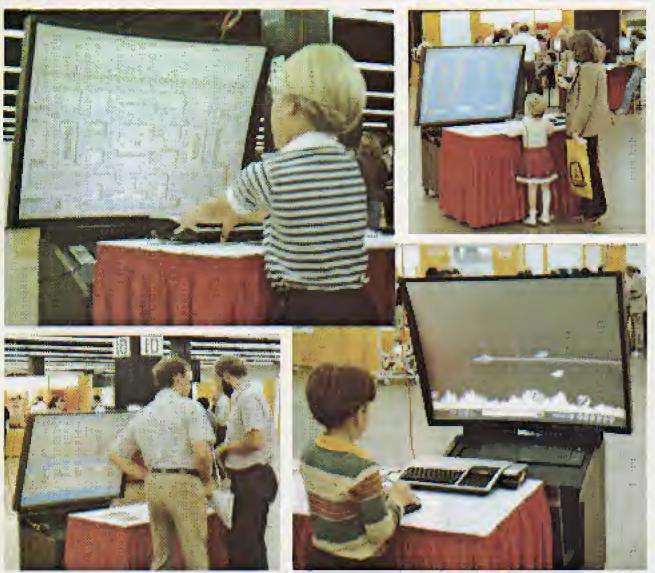
Third-party software producers and serious programmers will get a new development language when TI Forth becomes available for shipping in presumably the late Forth quarter. The language features and applications were demonstrated at the heavily-attended TI-Fest Forth seminar. The TI implementation includes an extra 64-column bit-mapped editor, a provision for HI-RES dot graphics, and simple control of Interrupt Service Routines (ISRs) that govern "simultaneous" processes—a feature that should find use in games, music and applications like print spooling.

99'er Digest is a marketing information service for retailers, distributors, third-party vendors, sales representatives, industry analysts, and other Ti-watchers interested in the home computing, personal computing and portable computing markets in which Texas Instruments is present. The publication is issued biweekly and mailed First Class. Aparent in the publication is issued biweekly and mailed First Class. Aparent in the publication is issued biweekly and mailed First Class. Aparent in the publication is issued biweekly and mailed First Class. Aparent in the publication is issued biweekly and mailed First Class. Aparent in the publication is issued biweekly and mailed First Class. Aparent in the publication is issued biweekly and mailed First Class. Aparent in the publication is issued biweekly and mailed First Class. Aparent in the publication is issued biweekly and mailed First Class. Aparent in the publication is issued biweekly and mailed First Class. Aparent in the publication is issued biweekly and mailed First Class. Aparent in the publication is issued biweekly and mailed First Class. puerig markets in which reads matruments is present, the publication is issued privately and maneu rich class, April propriate items of consumer interest are excerpted from the Digest in the monthly 99'er Magazine. For subscription of the propriate items of consumer interest are excerpted from the Digest in the monthly 99'er Magazine. For subscription of the propriate items of consumer interest are excerpted from the Digest in the monthly 99'er Magazine. For subscription of the propriate items of consumer interest are excerpted from the Digest in the monthly 99'er Magazine. For subscription of the propriate items of consumer interest are excerpted from the Digest in the monthly 99'er Magazine. For subscription of the propriate items of consumer interest are excerpted from the Digest in the monthly 99'er Magazine. The propriate items of consumer interest are excerpted from the Digest in the monthly 99'er Magazine. propriate items of consumer interest are exterpted from the organization time monthly are magazine, ror surdetails contact: Emerald Valley Publishing Co., 1500 Valley River Drive, Suite 250, Eugene, OR 97401.

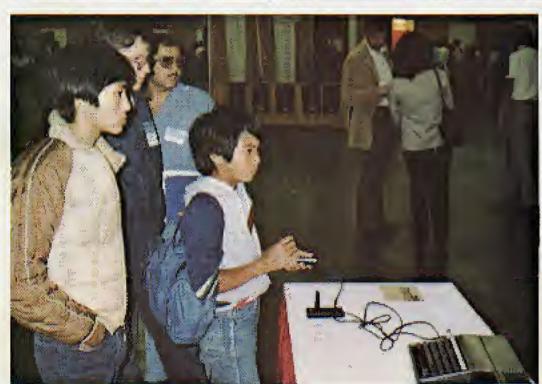
## "" TI-Fest: The Home Computer Show







t was an event that will be long remembered among the Texas Instruments Home Computer users, future users, and interested observers who attended. Three fun-filled and informative days (October 22-24) in the City by the Bay. Perfect weather, great food, and a unique hands-on opportunity for the nearly 18,000 showgoers to try all the latest TI hardware, software, and electronic learning aids, plus examine the compatible wares and services from the many innovative third-party vendors who also exhibited. Then there were the seminars—nearly four dozen well-attended sessions that proved to be a learning and enrichment experience without equal for those people who took the time to listen, look, and marvel at some of the





99'er Magazine December 1982











applications and features of the versatile "little \$20 machine." Additionally, there was an in-dept LOGO workshop, a chance to talk directly to knowledgeable TI employees and management, the opportunity to meet with other users from all ove the world, and the fun of competing for prizes it some of the most exciting arcade games even to grace a video screen. Hundreds of door prizes were also given away during the three-day event.

also given away during the three-day event.

T1-Fest was truly a Home Computer Show-the first of its kind. People of all ages and interest attended. It was not the typical hobbyist or bus nessman's show; rather, it was an event that a members of the family could enjoy and learn from





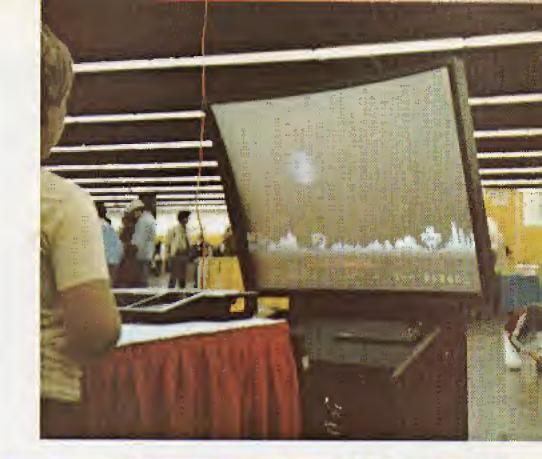


The unique floor layout and decor, as shown in these photos, emphasized the Disneyland-like separation of interests into Education Land, Computer Gaming Land, and 99-er Land (everything not specifically education or gaming). The nearly 200 Home Computer systems residing on large octagonal islands scattered throughout the 60,000 square feet of exhibit area projected a feeling of user-friendliness and invited hands-on participation. Large-screen projection TVs dotted the floor, and vendor booths provided the natural boundaries between the three island groups.

The nearly 60 hours of well-attended seminars covered a diverse range of subjects including





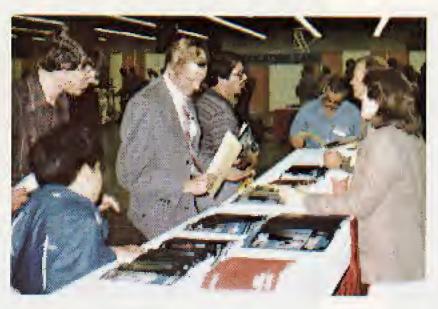












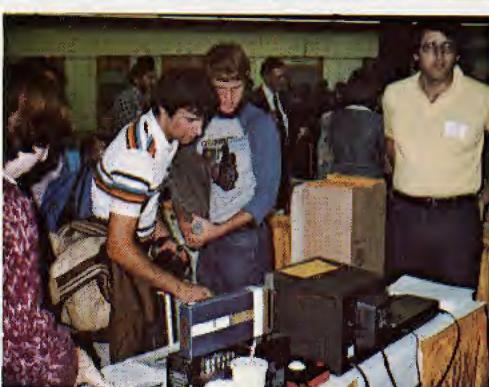




beginning tutorials in six different Home Computer languages, music, interactive video, and computer-assisted instruction for the retarded, as well as game design, commercial software development, word processing, and automated bookkeeping/accounting systems.

The vendors who exhibited at the show were selling a wide ranging collection of wares and services including game, educational, business, and home management software; modems; expansion boxes; joysticks; computer desks and printer stands; courses, posters; and commemorative mugs; double-sided disk drives; books and magazines; multi-level marketing plans and user group memberships; typewriter printers; cassette adapters and dust covers; and even some 16-bit T(I)-shirts.









28

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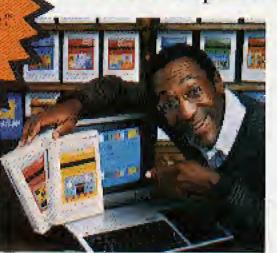
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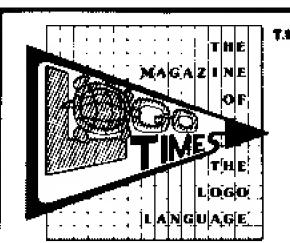
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#### Introduction

LOGO Times is an information resource for anyone interested in participating in the creation of their own personal language — one that will easily allow them to communicate with a computer in a totally new audiovisual realm of applied imagination, exploration, and self-discovery. The articles on these pages concern the use of the new TI LOGO language, but readers, however, do not need any additional software or equipment (or even a computer) to understand and learn from the material presented here.

If readers want to actually experience a TI LOGO environment, they will need either a TI-99/4 or TI-99/4A computer, the Expansion Memory peripheral, and the TI LOGO Command Module. A disk drive, although convenient to have, is not required; a user's work may alternately be saved on cassette tape, printed out on the TI Thermal Printer, or hand copied into a notebook (for later re-keyboarding).

In each issue, one or more of the articles may reference or build upon the topics discussed in a previous article. It is therefore recommended that for maximum benefit and understanding, new readers obtain the appropriate back issues of 99'er Magazine in which the LOGO Times articles are contained.

#### **Notice**

LOGO Times is actively soliciting articles. Manuscripts should be typed double-spaced, and accompanied by a cassette tape or disk if containing any lengthy procedures or graphics.

Send all materials to:

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All mail directed to the Letters-to-the Editor column (Letters on LOGO) will be published in accordance with the conditions set forth on 99'er Magazine's Masthead page.

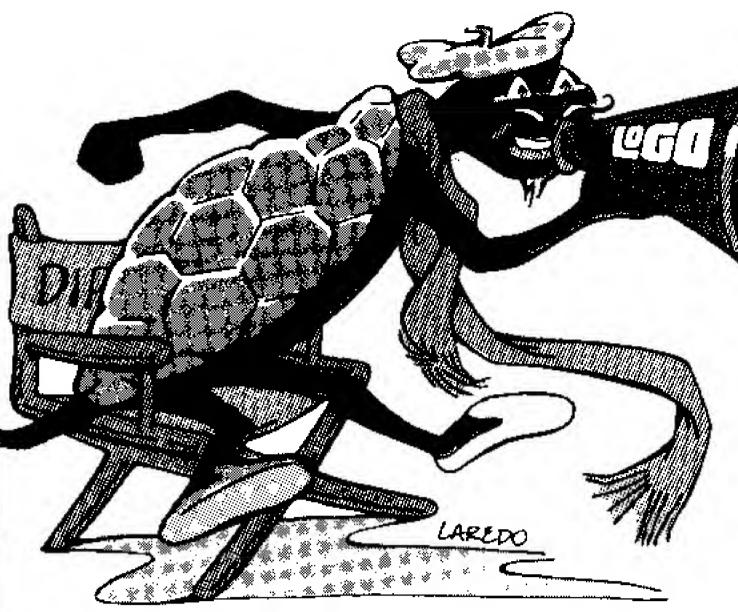
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## The Turtle Arcade:



reating computer games in LOGO is simple and straightforward. You can come up with great games and video shows using the LOGO statements you already know, plus a few new simple tricks.

#### **Animation and Animated Stories**

The trick to making animated characters in LOGO is to take advantage of the same illusion that has given us the motion picture. If a series of pictures, each slightly different, is flashed before your eyes you see them as continuous movement—what is known as the Phi phenomenon. You can do it with LOGO by making a sprite carry first one shape then a slightly different one—the quick succession—of shapes creating movement.

The motion seems continuous if the sprite rapidly alternates shape (such as the flying bird in the TI LOGO manual) or if the sprite carries successively different shapes. For cartoons with repeated motions (a stick figure walking or a Munchman munching) a sprite should alternate between two or three shapes. But remember, the shape numbers and sprite numbers are *not* the same; a sprite carrying shape 6, is not sprite 6. If you are hit with that bug, you end up with funny-looking and very uneconomical animation.

#### A LOGO Movie

To animate a series of events, just time the appearance of shapes in the positions you desire. For example, one of my younger students (a third grader) wanted to make a "movie" of a plane flying across the screen and dropping a bomb to blow up a bridge.

He let one sprite carry the plane and a second one carry the bomb. Because he made the bomb smaller than the plane, with both sprites moving together (i.e., same XCOR, YCOR, heading, and speed), and because the bomb sprite had a higher number than the plane sprite, the bomb was not visible.

By Henry Gorman
Contributing Editor

In his movie program, he schedule a suitable waiting period and the changed the heading and speed of the sprite carrying the bomb so that the bomb appeared to fall. Also, he schedu ed a suitable waiting period so that whe the plane reached the edge of the scree after dropping the bomb, the plane wa colored clear. Again he put a suitable waiting period into his program (whice he determined, by trial-and-error) so that the bomb reached its target. The bridg was made up of four different shape carried by six sprites. Finally, the bomb sprite and bridge-sprites dropped thos shapes (i.e., bomb and bridge) and car ried exploding shrapnel shapes, colore red. His concept was fairly simple. although calculating the correct waitin times was difficult.

The right waiting times can change depending on differences between computers and the amount of memorial already filled. These bugs can be taken out with coincidence checks, discussed in a later section of this article.

#### Beware, The Endless Movie

When you want to animate, you have to be careful where you use recursion. For example, suppose you wanted movie combining the tree-seasons program of the TI-LOGO manual with the flying bird program. Of course the sprite used for the trees could not also be used for the bird; neither could you show more than four sprites on a horizontal line. If you structure the programs:

TO MOVIE SETUP FLY SEASON END

The computer never finishes FLY because FLY is recursive and does not have a stop rule. And if you put SEASON before FLY, the computer never finished SEASON because SEASON also is recursive with no stop rule.

If you change FLY and SEASON so that they are not recursive and place them together into a recursive program:

TO MOVIE SETUP OVER END TO OVER SEASON FLY OVER END

## Movies & Games in LOGO

Your bird will flap only once with each change of season! Breaking the program into recursive and non-recursive subprograms is often a useful technique, but here it has created a terrible bug. A solution to the bug would be (a) write a nonrecursive FLY program, and (b) replace the WAIT commands in SEASON with:

REPEAT 50 [FLY]

Now, the replacement line serves the twin functions of keeping time between seasons and of causing animation when desired.

#### PRINT and TYPE

Some computer projects use written instructions, provide feedback (or scores), or require movie captions. These projects all need PRINT and/or TYPE commands. Both commands remove the outermost set of brackets from embedded lists—i.e., PRINT [[HELLO] [THERE]] prints [HELLO] (THERE).

After a PRINT command, the cursor performs a carriage return and starts a fresh line; after a TYPE command, the cursor simply remains one space past the last printed character. TYPE commands are preferable for messages using variable answers such as "YOUR SCORE IS 6." The sample message could be printed with TYPE [YOUR SCORE IS]. PRINT: SCORE.

To get a space between TYPEd messages or between a TYPEd message and a PRINTed message, you can either write PC 32 between the two commands, or put a space command between them such as:

TO SPACE PC 32 END

#### **Interactive Games**

Some projects require the user to think of answers, to make selections, or to respond to game plays. There are two ways to accomplish this interaction—through READCHAR (RC) or READLINE (RL). These two operations have some important differences. When READLINE is executed (either in a LOGO program or at command level), it prints a ">" character in lieu of the "?" prompt and waits until the ENTER key is pressed.

Any characters typed before ENTER is pressed become a list (and internally the computer places brackets [ ] around them). Thus "A = READLINE followed by a typed A and ENTER will produce

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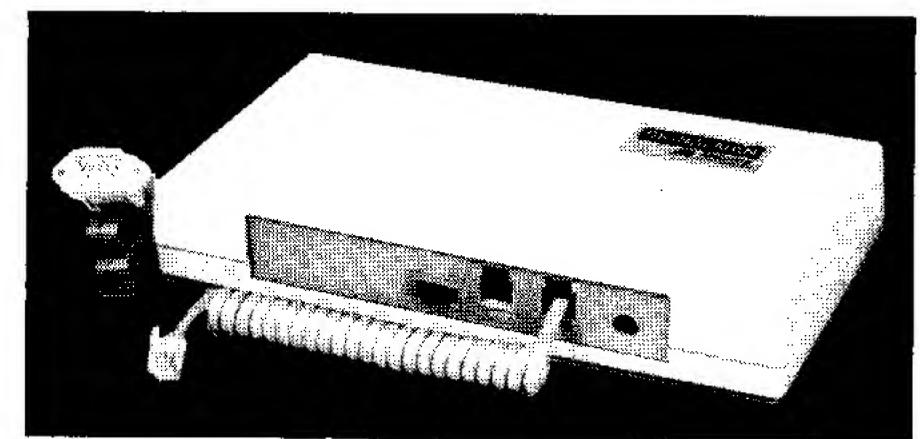
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Turtle Arcade... from p.33

FALSE, but [A] = READLINE under the same circumstances will yield TRUE. The fact that READLINE can take more than one typed character as input (which READCHAR cannot) is especially useful for commands requiring list input (e.g., EACH and RUN).

A major disadvantage of READLINE is: that you must press ENTER each time READLINE is used. READCHAR also makes the computer wait for a keyboard response; unlike READLINE there is no special prompt symbol; as soon as a key. is typed, that key is input as a word without showing on the monitor.

With both READCHAR and READLINE the input information is lost after it is used once—unless assigned a name as in:

CALL READLINE "ANSWER MAKE "ANSWER READLINE

An obvious problem can arise with these two commands: When a program executes either command, it does not continue until it receives the appropriate keyboard response. What if the game player wishes *not* to respond? To avoid this, you can use RC?; it outputs TRUE when a key is typed and FALSE otherwise. Put this together with TEST for:

TEST RC? IFT someaction IFF someotheraction The above code has one potential bug: whenever RC? becomes TRUE, it remains TRUE until the information in RC is assigned a name. To cure the bug use:

TEST RC? IFT CALL, RC ANSWER someaction IFF someotheraction

Watching Where You're Going

When people compose LOGO games, they often stumble onto bugs in the flow of control. Flow of control merely denotes the order of lines in a program. Ordinarily, control flows linearly from the first line to the last; it can branch with the use of IF conditionals, (IFT and IFF statements).

The great potential of LOGO as a procedural language admits to some contro! problems if you do not watch your step. To keep track of the flow of control, I anthropomorphize the computer and think of programs as controlled by "little men" who (a) may run only one program, (b) must stop when they reach END, STOP, or OUTPUT, and (c) literally do what they are told to do. Then I can follow control by sketching in the stick figures and watching when programs are assigned.

**Coincidence Checks** 

Earlier I alluded to problems of time delays in LOGO movies with interacting sprites. In games, you often want some visual effect to occur only when a sprite is at or near some target. For both cases,

use LOGO logic to run coincidence checks. In some games these coincidence checks are needed frequently, if only in restricted circumstances.

Because each coincidence check takes time, an economical program would run the checks only when they might be positive and only when a positive matters. For example, in an earlier article I developed a PONG-type game. In the game, the position of the ball relative to a paddle is immaterial when the ball is moving away from the paddle, so the coincidence checks should be performed only when the sprite carrying the ball is heading toward the paddle.

To make coincidence checks less time-consuming, those checks which use both an X and Y position can be divided:

TO CHECK TEST XCOR = :XTARGETIFT OUTPUT YCHECK **END** TO YCHECK OUTPUT YCOR = :YTARGET END

With split checks, the order of checking X and Y positions should be arranged so that the least likely coincidence is examined first.

An important consideration in some games is that the sprite of interest in a coincidence check may be moving very fast. Such circumstances hold two im-

Continued on p. 37

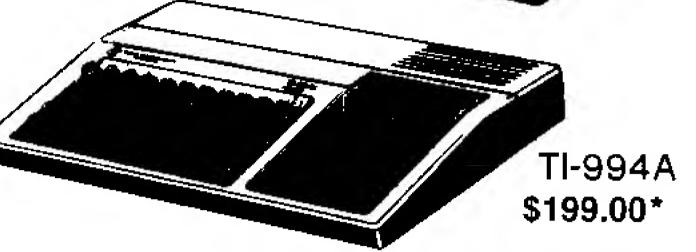


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Mailing List ... from p.11

Once you have added a new name, be prepared for a shock. The screen suddenly announces "SORTING." I must confess, it almost gave me apoplexy, having been preconditioned to SORTING on the TI Mailing List program. When the latter used to say SORTING, it meant it—and you couldn't use your computer for the next quarter hour. But don't despair; when this one threatens to sort, it is only a fast, and I mean fast, CALL to subprogram SORT in assembly language. In a couple of seconds the attractive boxes are right back, inviting you to enter some more names.

Print Only What You Want

The next option I suggest is SELECT TO PRINT. It will prepare your file for printing by pre-sorting according to any criteria you desire: last name, Zip code, the maiden name of your grandmother (just kidding, Charles)—in short any of the fields, as the people in the business would say. Now, this program must be done before you select the PRINT LABELS/LISTS program. It puts the correct pointers in place, such that you can print your labels or reports in the desired order. Sorting by Zip code, for example, takes a little more time than the usual sorting by last name, because the former is a diskette sort. It sorts at a rate of 32 names per minute, and you are informed of its progress at all times by a convenient message on the screen saying "PROCESSING RECORD #xxxx." By the way, you may have up to 500 names on one diskette with this mailing list program, opposed to 350 in the TI Mailing List.

Now comes the PRINT LABELS/LISTS program. It asks if you want labels or a name list, how many blank lines between labels, the print density, and whether you want all the names at once or if you want them individually displayed for your approval. Print speed will depend on the particular printer you are using and on the Baud rate.

For example, using an Epson MX-80 at 9600 Baud, this program will print about 8 labels per minute in any choice from 1 through 4-up.

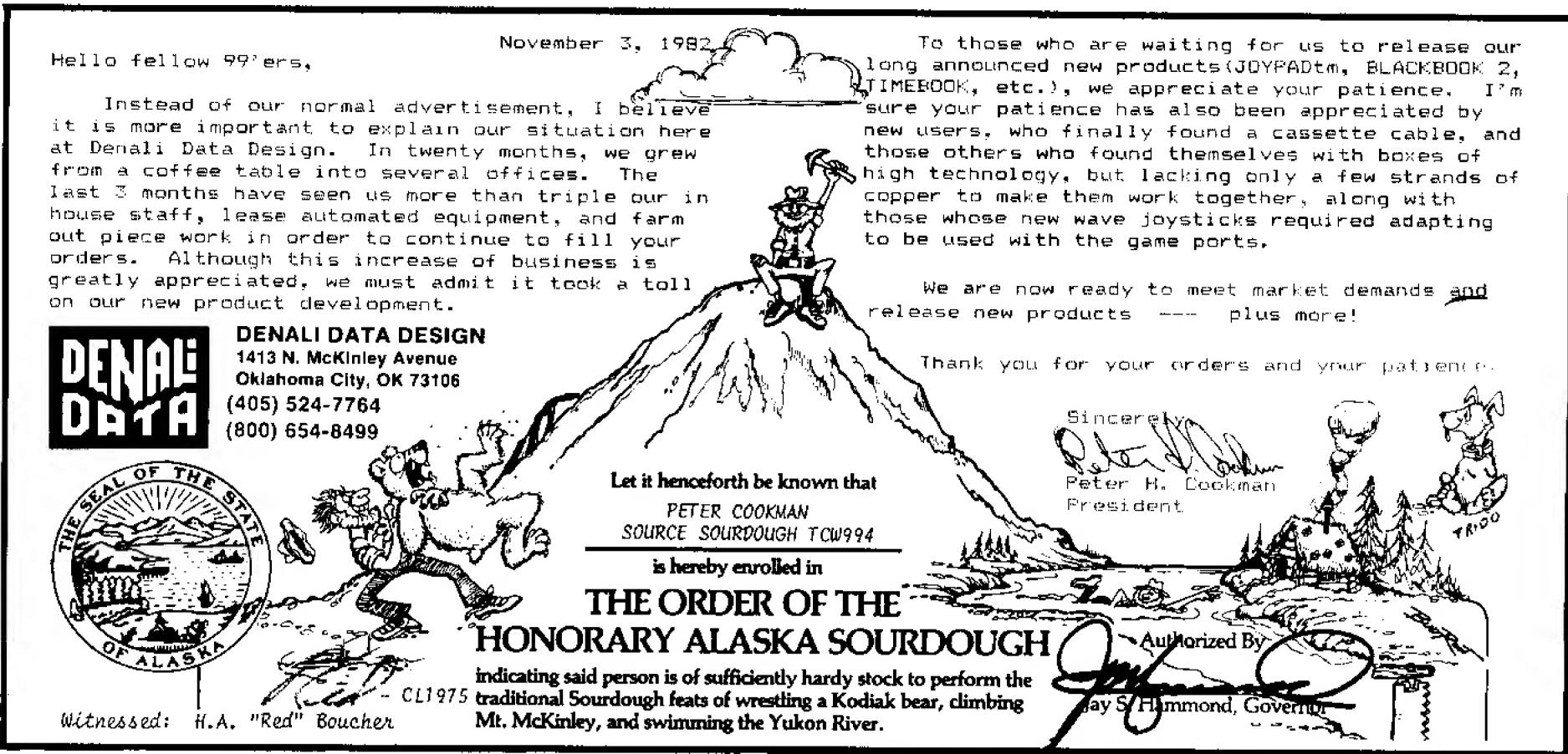
Finding Names You Can't Quite Remember

Another selection is the SEARCH/DISPLAY program. You are allowed to enter a part of a name (remember Zbigniew Morasczewski?) and the program will search for all possible matches. So, in the case of good old Zbiggy, all you have to enter is "Mora" and the program will do the rest. This is particularly handy for me. I am the editor of a TI-59 newsletter, and on any given day, 30 out of 4000 members will call and ask if I can send them a specific copy, article, program, or what have you. I used to ask the caller for a name and address, and I took notes. Then at the end of the day I would spend another hour and a half typing out mailing labels. Not anymore.

I just ask the caller for a name, type the beginning letters of it and, while we are talking, the first match appears on the screen. It usually takes no more than two tries to find the correct name and address. Now the program asks if I want it printed on the MX-80 I keep loaded with mailing labels. At my "Yes," I get a faultless label out of the machine. This feature alone has given me back an hour and a half of much-needed sleep per night. Assuming your computer is loaded already with this program (mine is 12 hours a day), it takes five seconds to find a name and another five to print the address on a label.

Writing "Personal" Letters

This is not all the Mailing List programs can do—not by a long shot. Another feature is the WORD PROCESS INTERFACE. Using a separate word processor program from Futura Software, you can put in special access codes for writing letters. Then, by means of this word processor interface program, you are able to put names and addresses



into marked spots in the letters—automatically. Neat, huh? You can create letters such as:

"Dear Mr. Jones, we at the TI PCC Notes are sad to find that your name doesn't appear on our 1982 subscription list. We would hate for you to miss a single issue. Therefore, Mr. Jones, we have included a subscription form with your name already printed in the right place. . ."

Of course, Mr. Watson, Mr. Morasczewski and Ms. Schmidt will receive the same "personal" letter. And if you run the letters on an electronic typewriter, each of these people will swear you wrote to them personally. Where in heaven would I find the time or the ambition, pray tell?

Insurance Against Shut-downs

Another sometimes handy option is the REBUILD NAME FILES program. If the: ADD/CHANGE/DELETE program is interrupted by an accidental glitch on the power line (forcing you to turn off the computer completely), it is possible that your name file pointers will be messed up. This program will pull that file from the crash and put you back in shape. All it takes is to load the program, insert your data diskette and let the program do its thing for about ten minutes.

The REORGANIZE FILES program is another highly useful addition. It allows you either to combine two files, or to split one file into several—for example, sorting the names from A to H on one diskette, from I to S on another, and from T to Z on still a third.

Finally (I always keep the *piece de resistance* for last, to savor it) there is a utility program called CONVERT

FROM TI LIST. Now, that one saved my life. Can you imagine re-typing 4000-plus names and expecting a no-error transfer? Impossible, you will say. Well, this program does it for you automatically, diskette to diskette, and initializes them for use in the new mailing list. You may also ask it to flash each name on the screen and let you decide, by means of a simple Y or N, if you want that one converted to the new list. I had a lot of garbage collected on the TI data diskettes—names not reachable through the Inquiry or the Search program which I called "untouchables." To my great relief, I got rid of the "untouchables" for good.

The transfer process in automatic mode takes about fifteen seconds per name. Manual mode, which lets you keep or delete a name, takes about twenty seconds per name. To type a name and address faultlessly would take at least a minute—and there is no such thing as "faultlessly." When I typed the names and addresses into the TI Mailing List, I averaged an error every thirty records. That's more than 130 errors among the 4000 names.

Last of all, every self-respecting menu should have an END OF JOB option. (Don't laugh, I have seen programs that made you press CONTROL CLEAR to get rid of them . . . otherwise, they would go in circles.) So, Option B lets you stop the works.

By now, you must have the impression I'm enthusiastic about this program— you bet I am!

Futura Mailing List—\$49.95. Available from: Ehninger Associates, Inc., P. O. Box 5581, Fort Worth, TX 76108.

797er

Plications for coincidence checks. First, the check should "lead" the sprite (i.e., the check should take place a little ahead of the actual target) so that you avoid such implausibles as a ball bouncing off the middle of a paddle. Second, with a rapid-moving sprite, it might "sneak" through a target between coincidence checks. To avoid this, you can

TO CHECK
TEST BOTH XCOR > (:XTARGET —
16) XCOR < (:XTARGET + 16)
IFT OUTPUT YCHECK
END

make your coincidence checks more le-

nient by setting up a range as with:

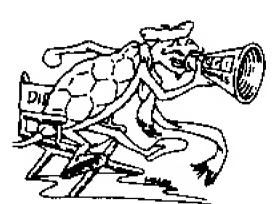
TO YCHECK
OUTPUT BOTH YCOR >
(:YTARGET — 16) YCOR <
(:YTARGET + 16)
END

For some games the target is moving. Because XCOR and YCOR only work for the current sprite, when you change which sprite you are addressing, you also change which sprite address you receive with XCOR and YCOR. Therefore, you must name and store (at least temporarily) the X and Y locations of the slower-moving sprite and then use these as your targets in checking coincidence:

TELL slowsprite
CALL XCOR "XTARGET
CALL YCOR "YTARGET
CHECK

TO CHECK TELL fastsprite

I hope these ideas help you design a great new game for the Turtle Arcade!





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### Oh No!...from p.23

null string to a zero value. The reduced DATA statement is:

300 DATA DOE, JOHN, -, 1, 3, ,, 2, 3, \*, 3

Each zero or other digit takes up three bytes. The statement now uses 50 bytes.

The DATA statement may be "scrunched" even further by removing all the commas between the numbers (put the zero values back in) and reading one string instead or ten:

300 DATA DOE, JOHN, – 0130023\*3
This DATA statement requires only 32 bytes.

The corresponding logic changes are: Change 200 READ LAST\$,FIRST\$,

INT\$

Change 220 PI\$ = SEG\$(INT\$,I,1)

In this case the number of interceptions was always less than a two-digit number. If you have data that may vary in the length of the string, you may use some sort of delineator, perhaps # or a space. For example, in combining the last name and first name to get rid of the comma and 2 more bytes, we'll use a space between the names. The program segment becomes:

200 READ NAME\$,INT\$

202 N = POS(NAME\$, "", 1)

204 LAST\$ = SEG\$(NAME\$, 1, N-1)

206 FIRST\$ = SEG\$(NAME\$,N + 1,

LEN(NAME\$) - N)

210 FOR I = 1 TO 10

220 PI\$ = SEG\$(INT\$,I,1)

260 NEXT I

300 DATA DOE JOHN, - 0130023\*3

The original DATA statement of 59 bytes has been reduced to 30 bytes. You will also be able to fit more data in each DATA statement, so for a large number of players there will be a significant savings in memory.

Even though the manual says 112 characters are permitted in a statement, you may have noticed that a DATA

statement with lots of commas sometimes causes 'LINE TOO LONG' at fewer than 100 characters. If you can combine data, you may avoid this problem.

**Combine Strings** 

You may READ separate strings or calculate numbers and do what is needed with them as separate units, but if they are always associated, put items together in one string. For example, suppose you read in a last name then a first name in an alphabetical list, but later want to arrange the names numerically according to a score. You no longer need last name and first name, so they may be combined:

500 NAME\$ = FIRST\$&" "&LAST\$

Don't GOTO

Look at the structure of your program. Perhaps draw arrows. If you have a GOTO 700, then from 700 have a few lines of programming then GOTO 2780, a few more lines, then GOTO 900, you should rearrange your program so it is executed in sequence. Every GOTO statement you can eliminate frees 10 bytes, besides making your program much more understandable.

Eliminate Unnecessary Statements

Quite often these statements occur during the editing process. Look through your listing for code that should have been deleted, statements that are never accessed, double GOTO statements, or other unnecessary statements. Examples are:

300 GOTO 1000

310 GOTO 1040

350 IF A = 0 THEN 320 ELSE 360

360 GOTO 800

1000 GOTO 1050

**Draw Efficiently** 

Look through the graphics statements and sketch your characters to see if you are drawing in the most

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efficient way. Use the repetition parameter wherever possible, even if some of the in between characters will be replaced. Besides usually saving memory, it is quicker. Here is a way to draw a line with alternating characters:

- 200 CALL HCHAR(5,1,42,31)
- 210 FOR Y = 2 TO 30 STEP 2
- 220 CALL HCHAR(5,Y,46)
- 230 NEXT Y

Remember the repetitions will go to the next line if you want, so you may use one statement:

200 CALL HCHAR(8,1,54,128) instead of three:

200 FOR I = 8 TO 11

210 CALL HCHAR(1,1,65,32)

220 NEXT I

**Reduce Logic** 

ON (numeric expression) GO-TO...and ON (numeric expression) GOSUB...may save many lines of IF-THEN coding if you can get the numeric expression reduced to consecutive integer conditions.

One example is using the arrow keys on a split keyboard scan. The codes returned for pressing the arrows keys are:

5 2 3 0

We don't use return codes 1 and 4, and the sequence starts with zero. The codes 1 and 4 will be the second and fifth statement numbers for the sequence, and we want those key codes to return to the CALL KEY statement. Note that it is perfectly okay for some of the statement numbers to be the same after the GOTO or GOSUB. Before the ON n GOTO or ON n GOSUB statement, be sure to eliminate all other numbers greater than or smaller than the number of statement numbers specified. In CALL KEY(0,K1,S1), K1 starts out as -1. In this example, any other key pressed returns to statement 300.

300 CALL KEY(1,K1,S1)

### 

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Considerations

10 IF (K1<0)+(K1>5) THEN 300 20 ON K1+1 GOTO 400,300,500,

600,300,700

400 Procedure for down

500 Procedure for left

600 Procedure for right

700 Procedure for up

### **TI Extended BASIC**

The maximum size of a TI Extended BASIC program is 864 bytes smaller than the maximum size of a TI BASIC program. However, there are more memory conserving tricks available in Extended BASIC. A big help is the SIZE command to determine how much memory space is free. This feature lets you experiment to see how much memory is taken up by various commands or procedures.

### **Stack Statements**

More than one statement may be on a line, (up to 140 characters). Multiple statement lines not only save memory, but also speed the program execution. Multiple statements on a line must be separated by a double colon. Using this mark requires that multiple colons in a PRINT statement be separated by a space.

### **Define Four Characters at Once**

Sketch and plan your graphics to take advantage of defining four characters with one statement, and using different magnification factors. A sprite with a magnification factor of 4 is actually made up of four characters and is double size, so you can have quite a large sprite just by specifying one character number in the CALL SPRITE statement. Economize with sprite commands. CALL MOTION, CALL SPRITE, and CALL PATTERN may specify more than one sprite at a time.

Think Through the Logic

Extended BASIC allows complex IF-THEN-ELSE statements, and you may use either statement numbers or commands. Map out your logic to take advantage of these capabilities with the fewest number of statements.

Continued on p. 40

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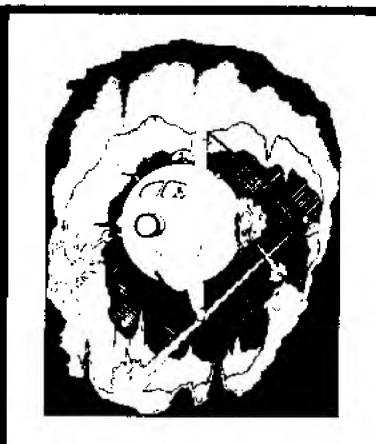
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TI BASIC required several lines of code to line up a list of figures or print a list of names in straight columns, IMAGE and PRINT USING or DISPLAY USING require little effort to left-justify string variables and right-justify numbers.

Assign More Than One Item

You may assign more than one variable at a time, like in initialization. 100 T,A,B,C=1

assigns 1 to each variable T, A, B, and C using one statement instead of four.

Repeat

Use RPT\$ in string handling to repeat a string expression any number of times (up to a string of 255 characters). An example to define four striped graphics characters for two sprites is:

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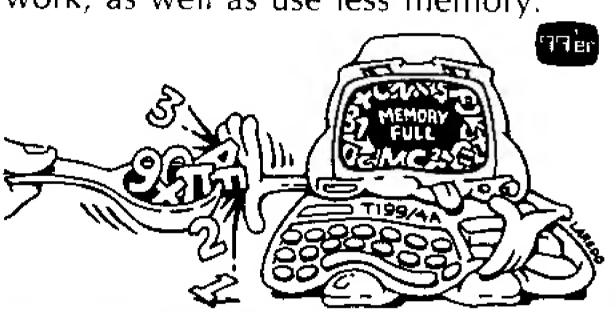
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- CALL CHAR(100, RPT\$("00FF", 100 16))
- 110 CALL MAGNIFY(4)
- 120 CALL SPRITE(#1,100,7,20,100, -5,5,#2,100,5,88,100,7,-4
- 130 GOTO 30

Finally—Use Extended BASIC

Read through the list of available builtin subprograms. Some of them may be able to replace several lines of code. You may as well let the computer do the work, as well as use less memory.



## DEBUGS ON DISPLAY

### **Screen Dump Utility**

Try as we might, occasionally an error slips by the editorial desk. Two such errors were discovered in Super Language: A Screen Dump Utility—Part 2 in the November 1982 issue. The first error occurs on Page 19, Column 2 about one-third of the way down. In the description for setting up the PAB, Bytes 10-35 should read:

File Descriptor, We'll use RS232.PA = N.DA = 8.BA = 9600.CR

The second error occurred on page 24, Column 2 under Mini-Memory Considerations. Step 5 should read as follows:

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THEY TOO MAKE THIS MAGAZINE POSSIBLE . . .

5. Put the entry point for DUMP into the DEF/REF table by entering the following lines:



AORG > 7FEB (CR) TEXT 'DUMP DATA > 7D14 (CR)

Note: There are 2 spaces required following the word DUMP in the above text directive for a total of 6 characters within the single quote marks. 99 er



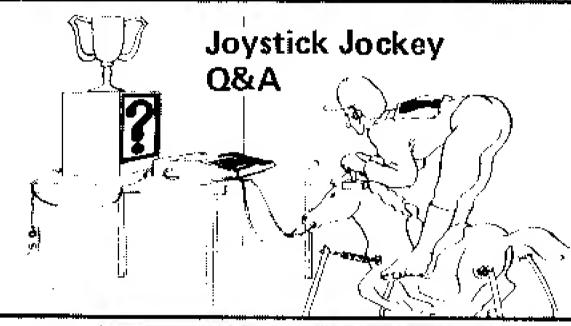
# 

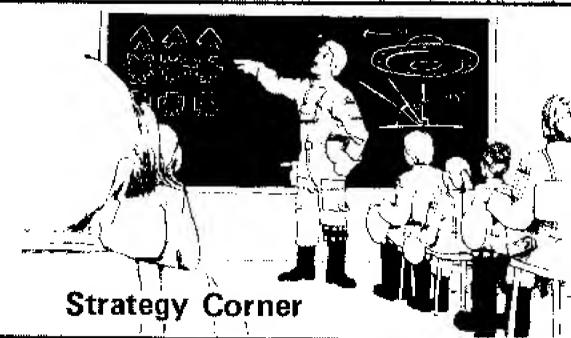
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99'er Hall of Fame candidates with high scores in TI, third-party, or Computer Gaming games must completely describe the conditions under which their scores were achieved (i.e., skill level, keyboard or joystick use, screen number, partner participation, appearance of screen, etc.). Candidates may not be directly related to or affiliated with the programmer of the game or the publishing firm. No compensation will be provided to new inductees whose names are chosen to be immortalized—Fame is its own reward...











Radventure-type game for the TI-99/4A couldn't be easier to run. Just put the diskette in drive I and select Extended BASIG. The program loads automatically and then asks if instructions are needed. Answering YES, prints out the legend behind the scenario—about fiften minutes of background reading.

Upon completion, another program loads automatically. You are then asked for the name of your character. Each character has four traits to which you assign random numbers given by the computer. The numbers assigned determine how well you can do things—fight or make friends, for example. If the character survives, his name and score is stored on disk and may be used later if you like.

At this time, you can proceed with the basic scenario, or put in another diskette with a different adventure—new rooms, treasures—and—monsters. Scenarios—II—and—III—are available at \$12.95 each, and require—the—original—diskette (\$24.95) to run them.

You select from four skill levels, and then the scenario is loaded into memory. The character shows up in one of more than 120 rooms containing 25 monsters, various treasures, devices, and weapons. Unlike most adventure programs using commands such as "TAKE KNIFE," there are instead, 14 major commands. These include four directions (N, S, E, W), attack (A), run (R), make friends (F), get, drop, or use something (G, D, U), look (L), inventory (I), condition (C), or quit (Q). This limits things somewhat, but not for experienced adventurers; it does, however, make it easier for the new adventurer to get a feel for these games. Like any adventure, there are the usual tricks that participants pick up along the way.

The object of Ringwraith's Lair is to rescue the princess and return her to safety—a task not easily accomplished (not to mention, trying to maximize your score!). In trying to get through the Lair and rescue the princess, you'll discover two less-than-ideal situations: One, you cannot save the game in progress in order to continue later. This means that if you quit, you kill the character, and

# Adventure Registry



### RINGWRAITH'S LAIR

An Adventure Successfully Completed

By Kevin Zeeb

#206, 14707 -- 77 St. Edmonton, Alberta CANADA T5C 1E7

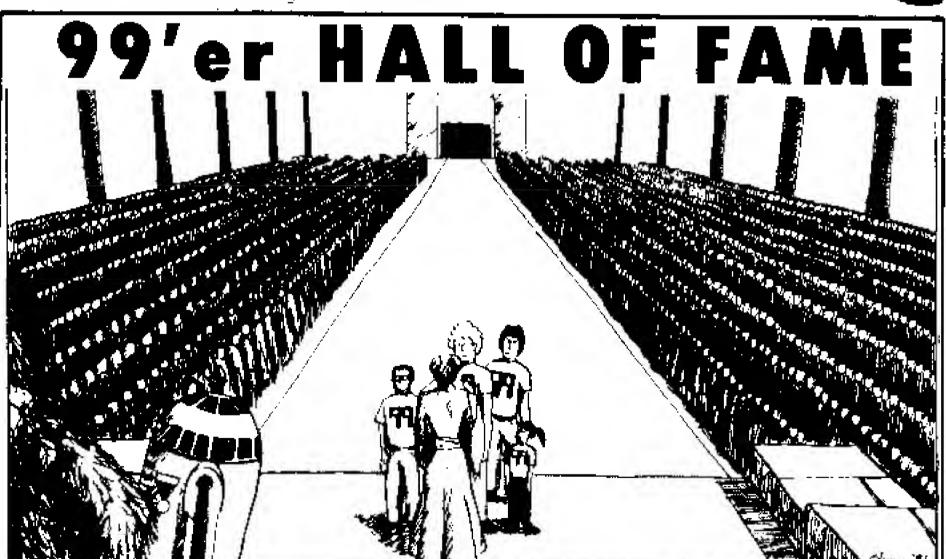
you must start from scratch. Therefore you'll have to record your progress on a map so you can re-trace your path. The second problem is fighting an enemy. The blow-by-blow description of the battle can get quite boring—especially after you miss ten times and your opponent hits you once. You just want to get the battle over with, and a minute later they're still going at it. Sigh! Just to print the outcome of the battle would have been better. Oh well, what game is perfect?

All in all, *Ringwraith's Lair* is a fair game—a welcome addition to the family of available

third-party software for the TI Home Computer. If you're an adventure fan, this game will probably be worth the money to you. If you're new to this game genre (and have the necessary peripherals), it will give you a pretty good idea of what adventuring is all about.

Now, back to the adventure.! How in the world do I get past those fire-breathing dragons? Hmmmmmmm.....

Ringwraith's Lair is available in Extended BASIC through Fantasy Computing, 1586 South Citrus, Escondido, CA: 92027.



This month's inductees all proved their merit under the competitive pressure at the 99'er TI-Fest gaming contest. Each 1st-place winner received a Home Computer and Software.

Name: Quyen Ton (of San Francisco, CA)

Game: Munch Man

**Score:** 293,970

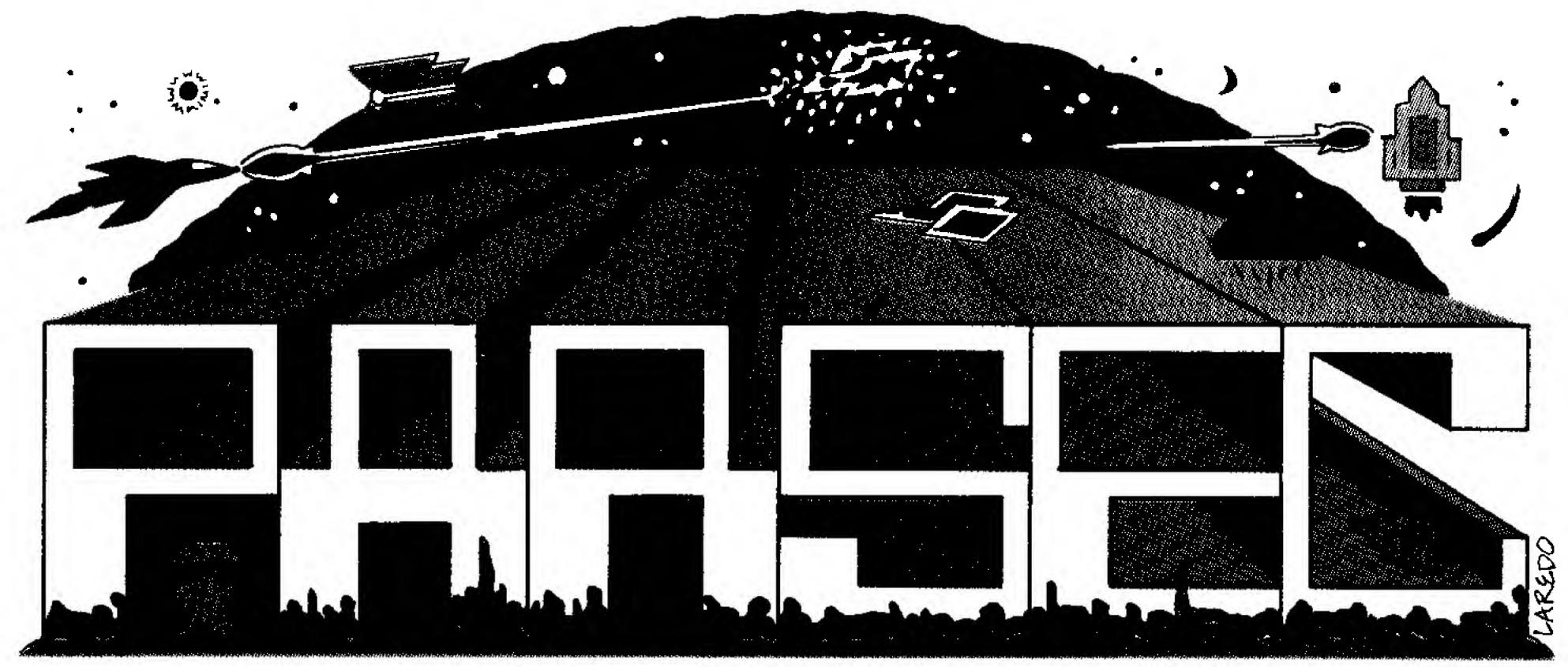
Name: Barry Fishman (of Gladwyne, PA)

Game: Tl Invaders

**Score**: 18,514

Name: Sean Lynch (of Portland, OR)

Game: Parsec Score: 44,900



### **An Arcade Game Review**

By C. Q. Umber Silicon Gulch, CA

overall, it was an enjoyable evening—plenty of video arcade action and excitement. Anyone observing me would have found it hard to believe that I was actually "working." That's because *my* work is what others regard as "play"....

You've probably never heard of me personally—even though some of the games I've worked on have achieved a fair measure of success and are presently quite popular. I'm not a namedropper and don't like to brag, so don't worry—you won't be subjected to a long, boring list of credits and accomplishments. Let the others take all the glory; the pleasure of the work itself is reward enough for me.

Although I look just like any other skillful game player while *at* the arcade—albeit, somewhat older than the average "hot-shot"—it's what I do when returning *home* that marks me as a professional: out comes a large pad of graph paper and colored marker pens, and on goes my word processor. What I attempt to do is make detailed notes of everything I've seen, heard, and experienced. I also draw accurate pictures of the interesting or unusual screen effects and dump the evening's recorded audio from the microcassette (in the pocket recorder I always carry with me) to a master tape in my library of arcade sound effects. Each new noise, musical passage, and speech pattern must then be carefully catalogued and indexed. As you can see, we game designers take our research work seriously.

On this particular evening, something bothered me—a strange feeling I couldn't quite put my trigger finger on. As I made my last entry in the computerized diary, and got ready to pull

the big plug and turn in for the night, a sudden blinding flash of psychic energy riveted me to my ergonometric chair and put me into what my worried wife later described as a trance-like state—complete with glazed eyes, shallow breathing, and obliviousness to my surroundings. I had seen it. . .the "ultimate" video game!

The next few days found me working at a feverish pace—trying to get down in some kind of recorded form everything I had seen in that rare split-second of eternity that most inventors can only dream of stumbling upon. By mid-week I had finished. Satisfied that all my thoughts were either safely down on paper or recorded on magnetic media, I packed my bags and headed for 99'er TI-Fest in San Francisco where I hoped to see some of the new Texas Instruments arcade gaming software.

It didn't take me long to zero in on the main gaming attraction—Parsec. The vivid imagery, spectacular explosions, and mysteriously monotonic female voice echoing all over the hall couldn't help but arouse the competitive nature of one battle-scarred joystick jockey like myself.

The Computer Gaming Land contest was well underway and I had a hard time finding an empty Parsec station. Finally, one trigger-happy senior citizen blew up his last ship when his own laser overheated. Shaking his head in utter disbelief, he headed for the showers. . . This was my chance. Paying no attention to the glares and stares of other showgoers as I leapt over two wheel chairs, elbowed my way through a visiting users group, and did an end run around a trio of Tliudges, I dove for the vacant joysticks and immediately obeyed the mysterious "electronic lady" when she told me to "press fire to begin."

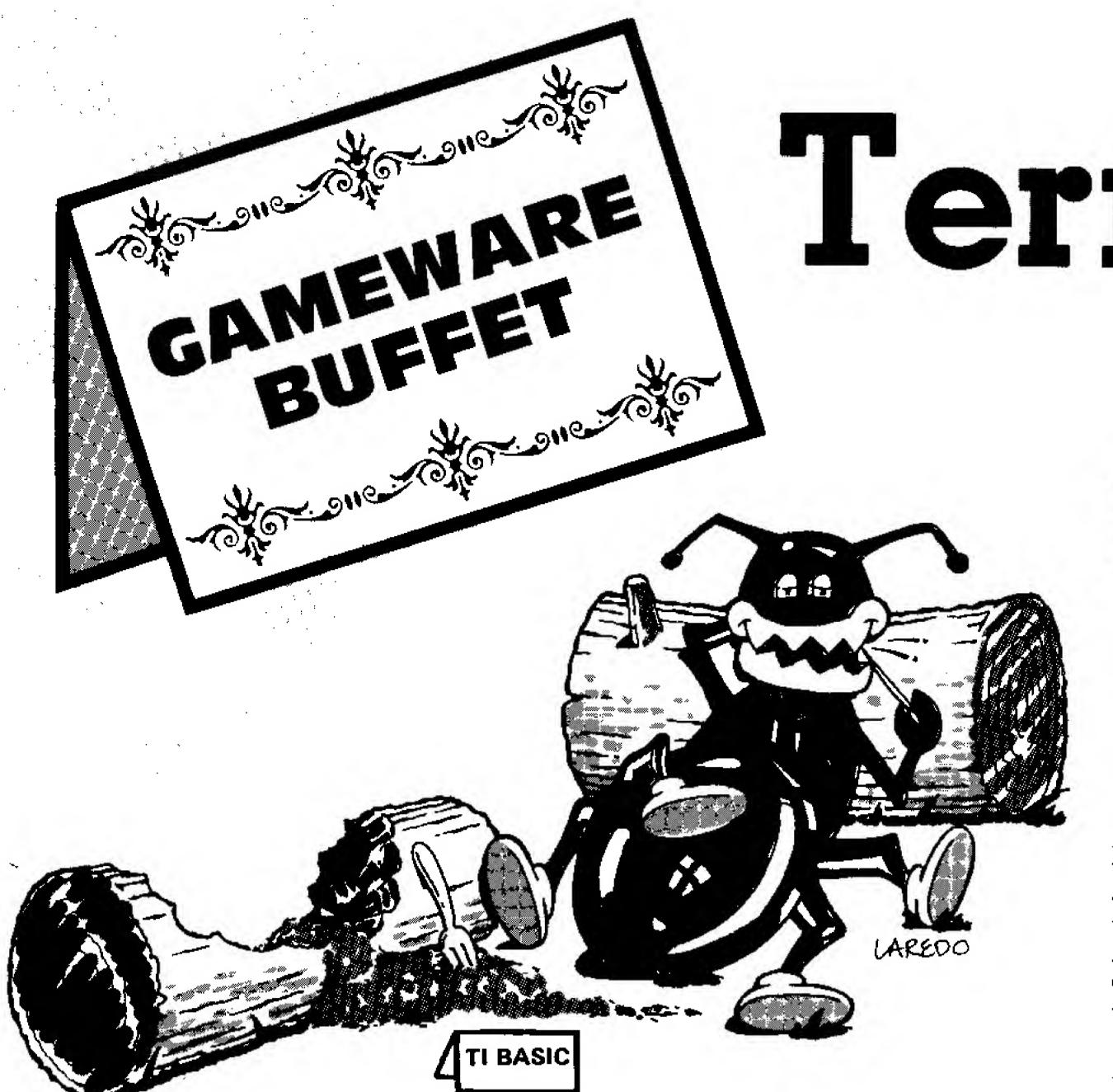
It wasn't hard for an old arcade prolike me to spot the elements of *Parsec* i that I first saw in three of the most successful arcade games of all time: As in *Defender* and *Scramble*, there is the illusion of flying over a planet's surface, the multi-level battles with a variety of alien craft, the required fuel monitoring and replenishment, and the dramatic explosions simulated by what appears to be over 100 pieces of radiating debris. And, as first seen in the immensely popular Asteroids game. *Parsec* contains the dual elements of maneuvering and blasting to avoid collisions with deadly chunks of space rock hurling toward a player's ship.

This is definitely *not* to say that Parsec is a "me-too" game—a silicon copy of any of its arcade predecessors. On the contrary, this new Texas Instruments game is refreshingly different. For one thing, the separate elements are cohesively orchestrated into a visually and audibly stimulating action and strategy game that is both easy to learn and more importantly, creates an environment (of minimum) intimidation) where playing skills may be progressively honed. This allows players of all ages to *learn* from the game and experience the satisfaction of improving their scores on a regular basis.

If you don't think this is important, just observe several players at a *Defender* arcade machine. You'll only see *two* types—the gaming pros like me who score a zillion points and can stay there a week on change of a dollar, and the vast majority of players who attempt to "get into" the game with a handful of quarters and never last more than ten seconds! Without fail, every one of these players who suffers this humiliating defeat ultimately swears off the game and even avoids

Continued on p. 47

43



lermite

By James R. Dew

4050 Shoreline Drive Robbinsdale, MN 55422

ere is a termite that doesn't deserve a visit from the tan man in the unmarked van. This bug will be welcome in any home—wood-frame or otherwise—as long as the place is furnished with a TI-99/4A.

TERMITE is a simple game, easily grasped by children, yet challenging and amusing enough to attract the attention of adults.

Your goal is to guide a termite through a block of wood (left to right) on the screen. The keyboard arrow keys control the little guy's movement. The block of wood is peppered with knots that the termite cannot chew through. If he hits a knot, he has to go back and start over. Of course, the knots in the wood are invisible, making the job a little tougher.

There are two levels of play in TER-MITE. In the first level, when the termite runs into a knot, the locations of all knots in the wood flash briefly on the screen.

# GOIA BUSIN

By William K. Balthrop



There was always a chance of striking the mother lode. People came from all parts of the country in search of riches. I too was caught up in the excitement, and before I knew it, I was on the trail with my pick, shovel, and two crates of dynamite.

I must have drifted for weeks before I settled on my claim. I don't know why I picked this spot—just a feeling I guess. The first day I hit solid rock — but I'm not one to get discouraged easily, so I started a new shaft. I was luckier this time, the loose dirt and rocks making for easy digging. I hadn't scratched as deep as my boot tops before my feeling about this area began to pay off.

It was only a small vein but it was gold! That yellow stuff so many people have lived and died for. I just knew this was the end of the rainbow . . . then, a few days later I hit solid granite! The only way through was to blast with dynamite, so I lit the fuse and ran like the devil. It was close, but the granite was cleared, and behind it was the most beautiful streak of gold I had ever seen. Little did I know that my luck was about to change.

I had gone back near the head of the mine when disaster struck. The wall began to crack and a gush of water flooded the entire shaft! This mining business is full of danger . . .

Sooner or later, you'll remember the location of the knots and be able to guide your termite safely through the wood.

In the more difficult mode of play, the only knots shown are the ones you hit, and the game gets considerably tougher.

**Programming Notes** 

For the sake of simplicity, this game contains logic generally considered poor programming practice. I refer to line 1550 which jumps into line 1570 upon a win. But line 1550 is in a subroutine, while the code starting at line 1570 will never do a RETURN! Instead, the main program is re-entered by a GOTO.

It works in this particular program because this code can only be executed twice - once for each level of play. If you did this in some programs,

#### the result would eventually be a \*MEMORY FULL\* error message. 100 REM 110 REM \* TERMITE 120 REM \*\*\*\*\*\*\*\*\* 130 REM BY J R DEW 99'ER VERSION 2.2.1 140 REM 150 REM 160 REM 170 CALL CLEAR 180 RANDOMIZE 190 PRINT "PRESENTING... :::::: 200 FDR X=1 TO 14 210 Z\$=Z\$&CHR\$(104)&" " 220 NEXT X 230 GOSUB 1830 240 FOR X=1 TO 11

### EXPLANATION OF THE PROGRAM *TERMITE*

Initialization

Line Nos.

100-340

350-480	Animated sequence for
-	introduction
490-690	Instructions
700-870	Main program loop
880-990	Hitting a knot
1000-1040	Subroutine to munch
1050-1240	Subroutine to disperse
	knot holes randomly
1250-1320	Subroutine to draw wood
	block
1330-1560	Subroutine to move
	termite
1570-1670	Routine to process a win
1680-1760	Input subroutine
1770-1890	Routines to define termite
	characters based on
	orientation
1900-1920	Subroutine invoked when
	too many turns are taken

250	PRINT Z\$::
260	NEXT X
270	FOR X=1 TO 5
280	GOSUB 1010
290	NEXT X
300	DIM M\$(9)
310	DEF RI(X)=INT(RND*X)+1
320	CALL CHAR (96, "FFFFFFFFFFFFFFFF"
	)
220	CALL CLEAR
340	CALL COLOR (9, 12, 1)
350	GOSUB 1250
360	CV=8
370	CH=6
380	D=3
390	FOR A=1 TO 15
	· -

### 400 GOSUB 1330 410 NEXT A 420 D=2

430 GOSUB 1330 440 GOSUB 1330 450 D=4

460 FOR A=1 TO 10 470 GOSUB 1330

480 NEXT A 490 PRINT TAB(10); "TERMITE":: "WANT INSTRUCTIONS (Y/N)?"

500 CV#CV-4 510 K\$#"YN"

520 GOSUB 1730 530 IF K=ASC(\*N")THEN 700

540 CALL CLEAR 550 PRINT "THIS IS THE GAME OF"::TA B(10); "TERMITE":: "IN WHICH YOU MUST GET YOUR TERMITE THROUGH THE WOOD"

560 PRINT "WITHOUT HITTING THE KNOT S. YOU MAY USE THE ARROW KEYS TO GET FROM THE LEFT TO THE RI GHT."::

570 PRINT "PRESS ANY KEY" 580 CALL KEY(0,K,S) 590 IF K\*S=0 THEN 580

600 CALL CLEAR 610 PRINT "WHEN YOU HIT A KNOT, YOU ": "MUST START OVER. IN THE": "EA

SY VERSION, I WILL SHOW" 620 PRINT "YOU WHERE ALL THE KNOTS ARE BEFORE YOU START OVER. IN": "THE TOUGH VERSION, YOU HAVE TO USE YOUR HEAD\*

630 PRINT :: "PRESS ANY KEY"

640 FOR X=1 TO 4 650 PRINT Z\$:: 660 NEXT X

670 CALL KEY(0,K,S) 680 GDSUB 1010

690 IF K#S=0 THEN 670 700 CALL CLEAR

710 PRINT "SELECT LEVEL OF PLAY"::: ::::"1-EASY":"2-TOUGH"::::::::::

The Program

When I started programming "Gold" Rush," I tried to simulate the prospector's dangers and rewards by setting up the screen so that the player could explore and actually see his mine being created.

The game begins with your miner standing on top of a block of earth. The miner is restricted to digging in any of three directions, down, left, or right. To move the miner, merely press any of the

four arrow keyş\*, \*(\*E;D;S,X.''

There are two ways to dig. The first is simply to *mine* a section. This is done by pressing the "M" key, followed by an arrow key for the direction of the dig. If the earth is not made of solid rock, or granite, the area you mined will clear, any gold ore discovered will be added. to your score, and the miner will advance into that area. The other method of digging is to blast.

On the surface is a small shack containing three boxes of dynamite. Each box contains ten sticks for blasting through solid rock, or granite. To pick up the dynamite, first position the miner over it and press "P." The dynamite will now follow you everywhere until you drop it by pressing "P" again. You set the dynamite and light the fuse by pressing "L" followed by an arrow key to designate which direction you are blasting (You can't blast upwards).

Once the arrow key is pressed, the fuse will start burning. You have about five seconds to get out of the area or be blown to bits! The miner must be at least three character spaces from the explosion.

You may have the misfortune of running into an underground stream. If you are lucky, you will discover the stream while digging downward, and that will be the end of it. Should you hit the stream while digging to the left or right you will have to move fast to keep from drowning in a *mine flood!* If the flood waters reach a downward shaft it will take that course until it must turn left or right. The flood will continue until there is no place left for it to go. Good luck and happy mining—the gold bug is coming, and he's looking for you . . .

[If the disk system is used without the 32K memory expansion, enter CALL FILES(1) before loading Gold Rush—Ed.]

### EXPLANATION OF THE PROGRAM Gold Rush Line Nos.

mille 1100.	
100-150	Rem statements, title and
	version.
160-170	Display the title screen.
180-200	Initialize variables.
210	Display level of play
	screen and input level.
220-260	Initialize variables for
	screen messages.
270-510	Initialize the mine area.

	Continued on p. 48
	Placement of rock, granite, gold, and
520-610	underground streams. Initialize graphics charactors, and display playing
620-720	screen.  Main control loop. Read keyboard and branch.
730-800	Move miner up.
810-890	Move miner left.
900-980	Move miner right.
990-1040	Move miner down.
1050-1130	Pick up, or drop
	dynamite.
1140-1450	Light dynamite.
1140-1150	Display message, check for
	position.
1160-1200	Read keyboard.
1210-1250	Place dynamite to the left.
1260-1280	Place dynamite to the
	right.
1290-1310	Place dynamite downward.
1320-1340	Countdown for fuse
	burning.
1350-1370	Explode dynamite.
1380-1390	Place new ladder in
	tunnel.
1400	Clear the shaft.
1410-1430	Check for ore content.
1440-1450	Hit gold.

flow.

1580-1630 Flood to the right.

1640-1670 Flood down a shaft.

1460-1800

1460-1480

1490-1510

1520-1570

1680-1730

Hit underground stream.

Display initial stream.

Check for direction of

Check for a branch in

flooding. Continued on p. 46

Flood to the left.

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2310

2320

2330

2340-2390

2390

### Gold Rush... from p.45 1740 Display message for get-

ting killed. 1750-1800 Read keyboard, and branch to move during the flooding. 1810-2180 Mining subroutine.

1810-1860 Read keyboard and branch to mine in any of three

directions. 1870-1960 Mine to the left. 1970-2060 Mine to the right.

2070-2180 Mine down.

2280

2290

2190-2210 End of game message option to play again. 2220-2270

Data for display, and sound.

Read data and display subroutine.

Read data, display, and input response.

2300 Read data, display, and input response with the validate option.

the contents of the mine. 2340 Initialize beginning of subroutine. P1 = x coordinate, P2 = y coordinate, z = the contents of the mine when m = 2, z =the value to place in the mine when m = 1. When m = 3 the mine is initialized. 2350-2360 Check for m(mode) in-

screen.

screen.

pressed.

itialize mine.

2370-2380 Check for m, return the value in the mine to

Display for Line 22 on the

Display for Line 24 on the

Subroutine to scan

keyboard until a key is

Subroutine to manipulate

variable z.

Place new value from z, into the mine.

### 100 REM \*\*\*\*\*\*\*\*\*\*\*\*\*

GOLD RUSH 110 REM # 120 REM \*\*\*\*\*\*\*\*\*\*\*\*\*

130 REM \* BY W.K.BALTHROP \* 140 REM 99'ER VERSION 2.2.1XB

150 REM 160 CALL CLEAR :: CALL SCREEN(16)::

DIM DC(4) 170 RESTORE 2220 :: GOSUB 2280 :: G OSUB 2280 :: GOSUB 2280 :: GOSU B 2330

180 CALL CHAR (96, "FFFFFFFFFFFFFFFF O"):: CALL COLOR(9,2,5)

190 SM1=9 :: SM2=169 :: D1,D3,D5=9 :: D2=193 :: D4=201 :: D6=209 : : DC(2), DC(3), DC(4)=10

200 CALL AR(0,0,0,3)

210 CALL CLEAR :: RESTORE 2240 :: F 340 P3=P1 :: P4\*P2 OR X=1 TO 6 :: GOSUB 2280 :: NE 350 FOR X=1 TO 10

220 D1\$="UP" :: D2\$="LEFT" :: D3\$=" T THAT WAY" :: D6\$="TAKE DYNAMI TE"

230 D7\*="OK" :: D8\*="NO DYNAMITE" : : D9\$="DROP DYNAMITE" :: D10\$=" LIGHT FUSE" :: D11\*="INPUT DIRE CTION"

240 D12\$="NO DYNAMITE..." :: D13\$=" CAN'T DO THAT" :: D14\*#"FUSE BU RNING" :: D15\*="SHAFT IS CLEAR" 250 D16\$="GOLD!-VALUE\$" :: D18\$="DI

260 D20\$="GRANITE" :: D21\$="FLOOD!" :: D22\*="YOU'VE BEEN KILLED IN A" :: D23\$="BLAST"

RT." :: D19\$="SOLID ROCK."

270 CALL CLEAR :: RESTORE 2230 :: 6 OSUB 2280 :: RANDOMIZE

280 FOR X=1 TO B#30 :: P1=INT(RND#1 9)+1 :: P2=INT(RND\*28)+1 :: CAL L AR(P1, P2, 2, 2):: NEXT X 290 FOR X=1 TO B#20 :: P1=INT(RND#1

9)+1 :: P2=INT(RND\*28)+1 :: CAL L AR(P1, P2, 3, 2):: NEXT X

300 FOR X=1 TO B#5 :: P1=INT(RND#18 )+2 :: P2=INT(RND\*27)+1

310 CALL AR(P1, P2, 5, 2):: CALL AR(P1 ,P2+1,5,2):: NEXT X

320 P1=INT(RND#10)+10 :: P2=INT(RND **\*26)+2** 

330 FOR FM=0 TO 2 :: NZ=INT(RND:151 )+100 :: CALL AR(P1,P2+FM,NZ,2) :: NEXT FM

XT X :: GOSUB 2300 :: B=VAL(AN\$) 360 P1=INT(RND\$9)+P3-4 :: P2=INT(RN D#11)+P4-5

RIGHT" :: D4\$="DOWN" :: D5\$="NO 370 IF P1>19 OR P2<1 OR P2>28 THEN 360

> 380 CALL AR (P1, P2, Z, 1):: IF Z<4 THE N NZ=INT(RND\*75)+26 :: CALL AR( P1, P2, NZ, 2) ELSE GOTO 360

390 NEXT X

400 FOR X=1 TO 10

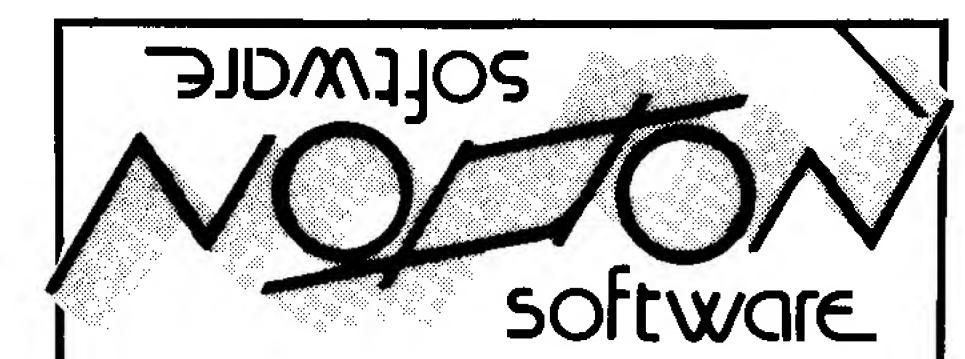
410 P1=INT(RND#10)+10 :: P2=INT(RND **\*28)+1** 

420 CALL AR(P1,P2,Z,1):: IF Z<4 THE N NZ=INT(RND#25)+10 :: CALL AR( P1,P2,NZ,2)ELSE 60TO 410

430 NEXT X

440 FOR X=1 TO 20

Continued on p. 49



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### PARSEC... from p.43

walking too close to the machine on subsequent visits to the arcade. . .

Parsec is a rare blend of 16-color graphics, human-quality synthetic speech, animation, and sound effects. It truly shows off the features of what is obviously a marvelous game machine—one that is, however, marketed as a "home computer." If this is any indication of multi-purpose home machines to come, the games-only machines (a la Atari VCS) will soon be relics of the past.

The natural, life-like speech adds an important element to the game play. The *female* synthesized voice (the speech synthesizer is necessary if you want to hear it) enhances the game by simulating a starship's onboard computer; it warns of oncoming alien craft and refueling tunnels, informs you when your lasers are "on target," let's you know when extra ships and points are awarded, and congratulates good performance. Although not necessary for play, the voice allows you to concentrate more fully on activity above the planet's surface instead of having to visually check messages printed at the bottom of the screen.

If you plan on purchasing *Parsec,* I suggest you also invest in some good joysticks. The standard TI issue I used at the show performed adequately

enough. There were also a few other brands being sold at some of the ex--hibitor booths, but I didn't get a chance to try them. From my observation of show players, I predict that *Parsec* addictees—and this game will definitely foster a fair share of them—will inevitably experience a case of "iovstick" cramps" in their early bouts with the game. This results from clutching the joystick too tightly in the heat of fierce. combat. After a player learns to relax more and avoid unnecessary vertical movement and laser bursts, his or her score should increase dramatically; the pain and numbness in the fingers and hand will then also disappear.

master charge

THE WITEPBANK (AND

Of course, use of joysticks can be avoided altogether because the keyboard has also been programmed for lateral and vertical movement, as well as firing the laser. Professionals like myself, prefer the keyboard to joysticks. The interaction is faster and more precise—but it takes a while to build up the necessary finger dexterity. Joysticks do, however, allow a player to comfortably sit back further from the screen, and they enhance the realism of ship control—especially when navigating through treacherous, narrow subterranean passages or through dense fields of tumbling asteroids.

But even though a player uses joysticks, some involvement with the keyboard is still necessary. For example,

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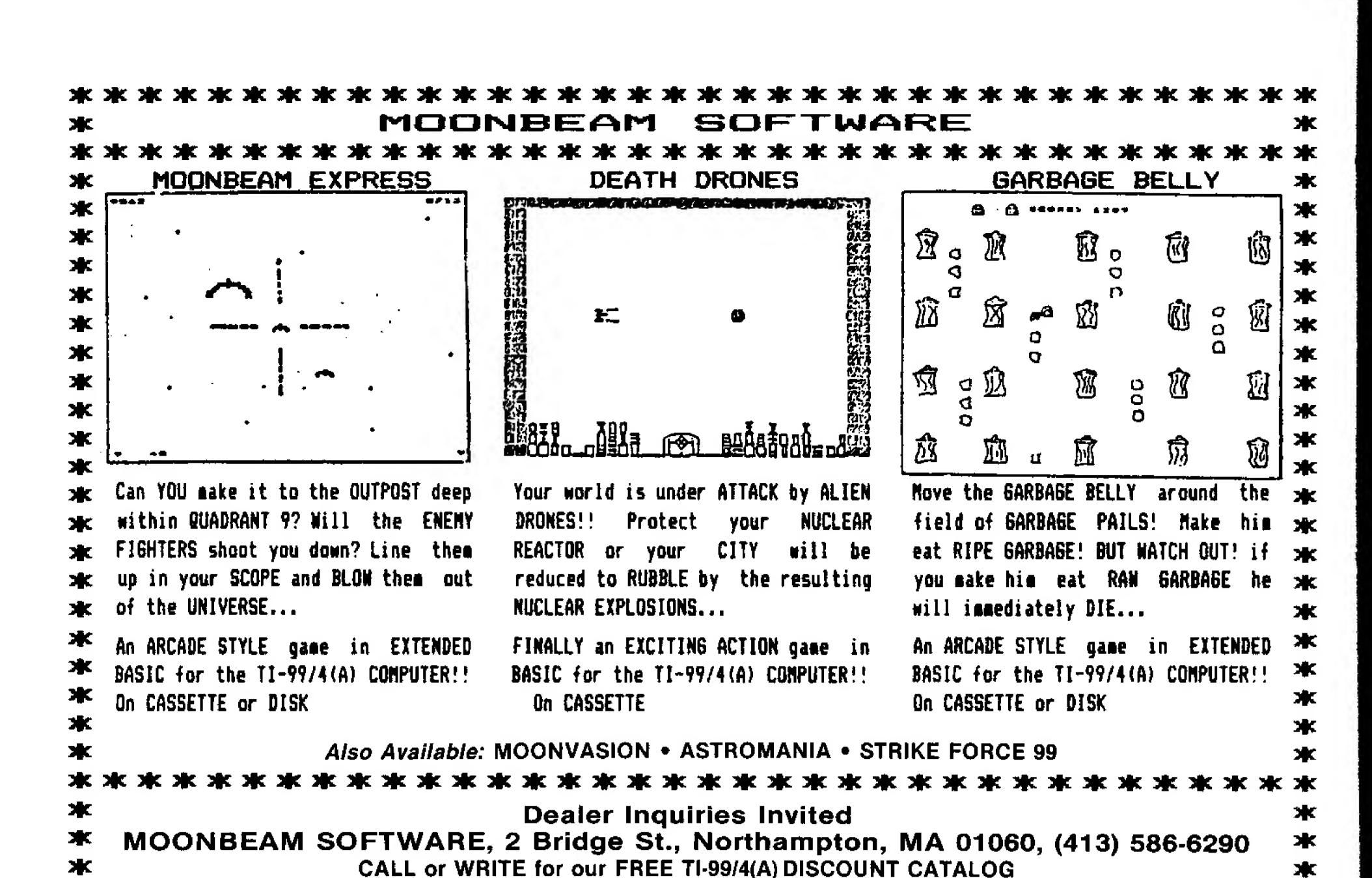
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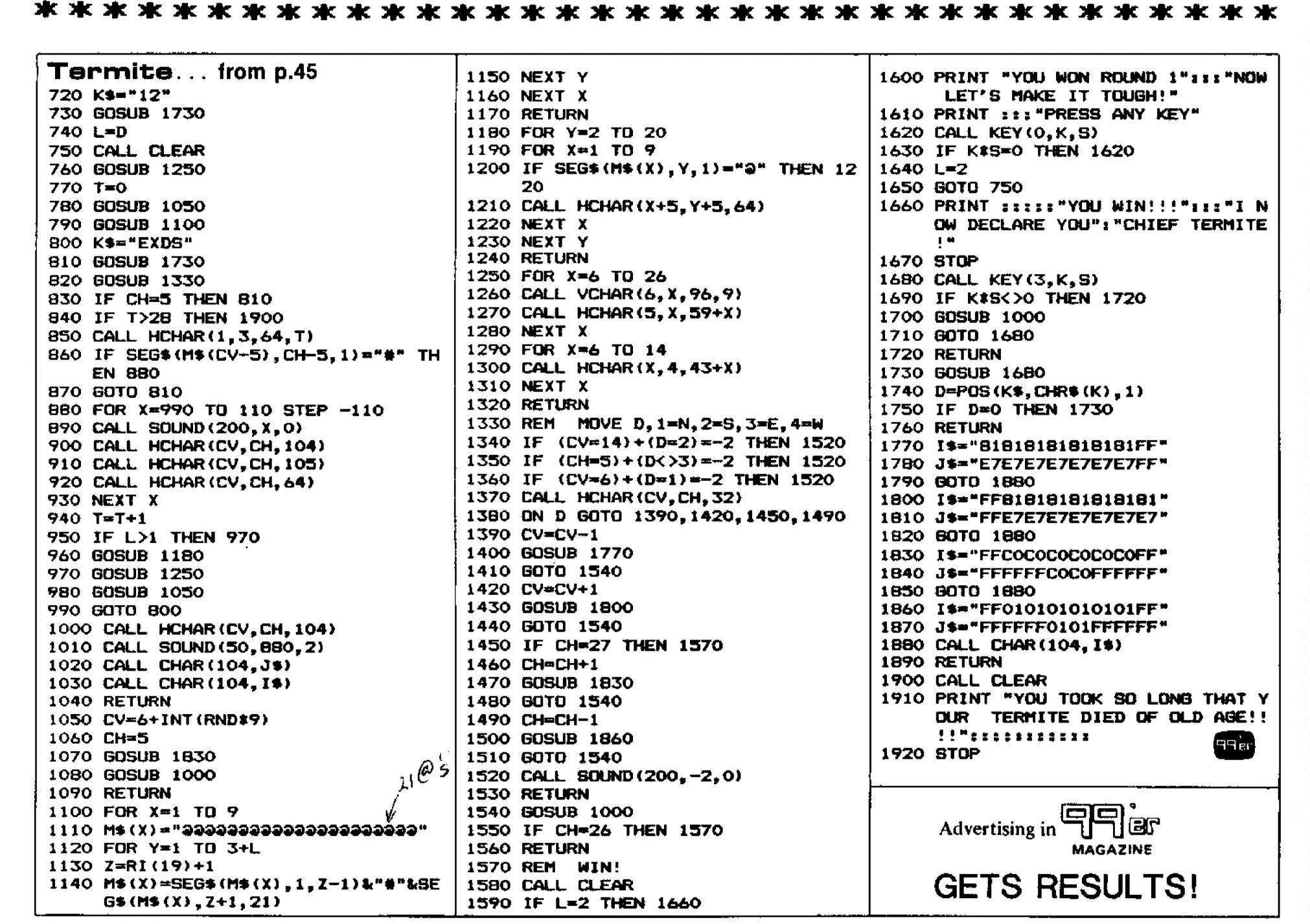
pressing the number keys 1, 2, and 3 varies the speed (and hence, affects the sensitivity of the joystick) at which a player's ship can move vertically. (Hike Lift 3 for doing battle with all shooting ships—e.g., the DRAMITES, URBITES and BYNITES; Lift 2 for navigating my way through the asteroid belts and tracking the devious ramming-type craft—e.g., SWOOPERS, SAUCERS, and low-flying LTF's; and Lift 1 for traversing the underground fuel tunnels). A joystick user might also want to freeze the action (an excellent learning device, but frowned upon in competition) by depressing the console's P key.

As I said earlier, the action and special effects are skillfully integrated. The two TI programmers Jim Dramis and Paul Urbanus [see the January issue for our "Designer's Spotlight" interview with Mr. Dramis—Ed.) evidentally knew just what they were doing. *Parsec* is indeed a highly polished arcade game. It provides an excellent "keep 'em at home" form of family entertainment (especially on a large-screen projection TV), and is an ideal software package—just plug in the cartridge and press a couple of keys—for video gaming competition. And at a suggested retail of \$39.95, the price is right...

Speaking of competition, I didn't notice when a crowd of people started gathering around me during the TI-Fest

Continued on p. 64





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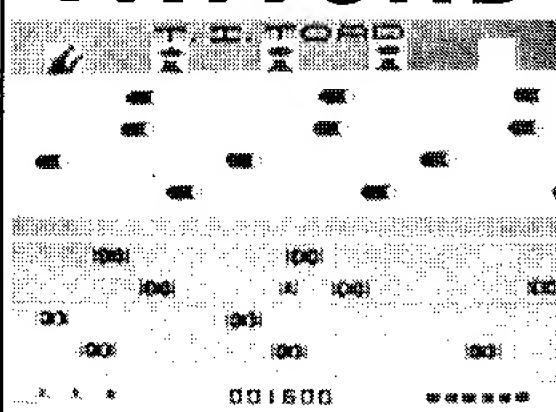
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Software Specialties, Inc. Box 18051, Denver, CO 80218

### Gold Rush... from p.46

- 450 P1=INT(RND\*15)+5 :: P2=INT(RND\* 28)+1
- 460 CALL AR(P1,P2,Z,1):: IF Z<4 THE N NZ=INT(RND#25)+10 :: CALL AR( P1,P2,NZ,2)ELSE 60T0 450
- 470 NEXT X
- 480 FOR X=1 TO 30
- 490 P1=INT(RND#10)+2 :: P2=INT(RND# 28)+1
- 500 CALL AR(P1,P2,Z,1):: IF Z<4 THE N NZ=INT(RND\$15)+10 :: CALL AR( P1, P2, NZ, 2) ELSE GOTO 490
- 510 NEXT X
- 520 CALL CLEAR :: CALL HCHAR (3, 1, 96 .608):: CALL VCHAR(1,31,117,96) :: CALL COLOR(12,7,16)
- 530 CALL CHAR(104, "06E6427E42470D09 0000001F7FDF00001Q08043C3C3C")
- 540 CALL CHAR(112, "01071C74C4040404 00000001071C70C0001B7EC3")
- 550 CALL CHAR (115, "00000080E0380E03
- 560 CALL COLOR(11,13,1):: CALL CHAR (120, "1072401A0E604C01CB4259882 2449908")
- 570 CALL COLOR(13,13,1):: CALL CHAR (128, "7E42427E42427E42"):: CALL COLOR (14, 5, 5)
- 580 CALL HCHAR(2,24,112):: CALL HCH AR(2,28,116):: CALL HCHAR(1,25, 113)
- 590 CALL HCHAR(1,26,114):: CALL HCH AR(1,27,115)
- 600 CALL SPRITE(#2,106,2,D1,D2,#3,1 06, 2, D3, D4, #4, 106, 2, D5, D6, #1, 10 4,13,5M1,SM2)
- 610 RESTORE 2260 :: GOSUB 2280
- 620 K=0 :: CALL KEY(0,K,S):: SP1=(S M1+7)/8-2 :: SP2=(SM2+7)/8-2
- 630 DISPLAY AT(23,1):"" 640 IF K=69 THEN BOSUB 730 :: GOTO 420
- 650 IF K=83 THEN GOSUB 810 :: GOTO 620

- 660 IF K=68 THEN GOSUB 900 :: GOTO 620
- 670 IF K=88 THEN GOSUS 990 :: GOTO 620 480 IF K=80 THEN 1050
- 690 IF K≠76 THEN 1140 700 IF K=77 THEN 1810
- 710 IF K±15 THEN 2200
- 720 GOTO 620
- 730 A\$=D1\$ :: GUSUB 2320
- 740 IF SP141 THEN 770
- 750 IF SP1=1 THEN 780 760 CALL AR(SP1-1,SP2,Z,1):: IF Z=B
- **THEN 780** 770 A\$=D5\$ :: GOSUB 2310 :: RETURN 780 A\$=D7\$ :: GOSUB 2310 :: SP!=SP1 -1 :: SM1=SM1-8 :: CALL LOCATE(
- #1,SM1,SM2) 790 IF CAR=1 THEN CALL LOCATE(#CAR1 ,SM1,SM2)
- BOO RETURN
- 810 A\$=D2\$ :: GOSUB 2320
- 820 IF SP2=1 THEN 770
- 830 IF SP1=0 THEN 880
- 840 CALL AR(SP1, SP2-1, Z, 1):: IF Z=7 OR 7=8 THEN 870
- 850 IF Z=6 THEN 870
- 860 A\*=D5\* :: GOSUB 2310 :: RETURN
- 870 IF SP1#19 THEN 880 ELSE CALL AR (SP1+1,SP2,Z,1):: IF Z≈7 THEN 2 190
- 880 SP2=SP2-1 :: SM2=SM2-8 :: CALL LOCATE(#1,SM1,SM2):: IF CAR=1 T HEN CALL LOCATE (#CAR1, SM1, SM2)
- 890 RETURN
- 900 A\$=D3\$ :: GOSUB 2320
- 910 IF SP2=28 THEN 770 920 IF SP1=0 THEN 970
- 930 CALL AR(SP1, SP2+1, Z, 1):: IF Z=7 OR Z=8 THEN 960
- 940 IF Z=6 THEN 960
- 950 A\*=D5\* :: GOSUB 2310 :: RETURN 960 IF SP1=19 THEN 970 ELSE CALL AR
- (SP1+1,SP2,7,1):: IF Z=7 THEN 2 190

- 970 SP2=SP2+1 :: SM2=SM2+8 :: CALL LOCATE(#1,SM1,SM2):: IF CAR=1 T HEN CALL LOCATE (#CAR1, SM1, SM2)
- 980 RETURN
- 990 A\$=D4\$ :: GOSUB 2320
- 1000 IF SP1=19 THEN 770
- 1010 CALL AR(SP1+1, SP2, Z, 1):: IF Z< 7 OR Z>8 THEN A\$=D5\$ :: GOSUB 2310 :: RETURN
- 1020 IF Z<>8 THEN GOTO 2190
- 1030 SP1=SP1+1 :: SM1=SM1+8 :: CALL LOCATE(#1,SM1,SM2):: IF CAR=1 THEN CALL LOCATE (#CAR1, SM1, SM
- 1040 RETURN
- 1050 IF CAR=1 THEN 1100 ELSE As=D6\$ :: GOSUB 2320
- 1060 IF SM1=D1 AND SM2=D2 THEN CAR= 1 :: CAR1=2 :: A\$=D7\$ :: GOSUB 2310 :: D1,D2=0 :: GDTO 620
- 1070 IF SM1=D3 AND SM2=D4 THEN CAR= 1 :: CAR1=3 :: A\$=D7\$ :: GOSUB
- 2310 :: D3,D4=0 :: GOTO 620 1080 IF SM1=D5 AND SM2=D6 THEN CAR= 1 :: CAR1=4 :: A\$=D7\$ :: GOSUB
- 2310 :: D5,D6=0 :: GOTO 620 1090 A\*=DB\$ :: GOSUB 2310 :: GOTO 6
- 1100 A\$#D9\$ :: GOSUB 2320
- 1110 IF CAR1=2 THEN D1=SM1 :: D2=SM 2 :: CAR=0 :: GOTO 620
- 1120 IF CAR1=3 THEN D3=SM1 :: D4=SM 2 :: CAR=0 :: GDTO 620
- 1130 IF CAR1=4 THEN D5=SM1 :: D6=SM 2 :: CAR=0 :: GDT0 620
- 1140 A\$=D10\$ :: GOSUB 2320 :: A\$=D1 1 :: GOSUB 2310
- 1150 IF CAR=O DR DC(CAR1)=O THEN A\$ **=D12** ★ :: GOSUB 2310 :: GOTO 62 0
- 1160 GOSUB 2330

99'er Magazine

- 1170 IF K=83 THEN 1210
- 1180 IF K=69 THEN 1260
- 1190 IF K=88 THEN 1290
- 1200 CALL SOUND(100,550,0):: 60TO 1 160
  - Continued on p. 50

December 1982

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NO NONSENSE SOFTWARE for the TI 99/4A. All software comes in disk or cossette form with an audio cassette and written instructions.

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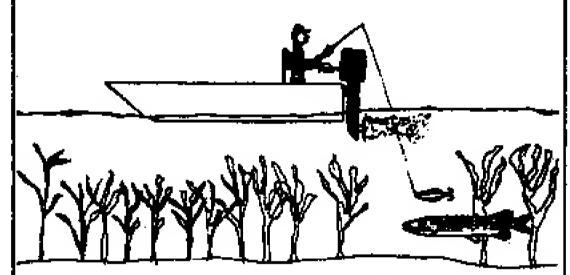
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### Gold Rush...from p.49

1210 IF SP2<2 THEN AS=D13\$ :: GOSUB 2310 :: 60TO 620

1220 CALL AR(SP1, SP2-1, Z, 1):: IF Z= 7 OR Z=8 THEN A\$=013\$ :: GOSUB 2310 :: GOTD 620

1230 CALL SPRITE (#5,105,7,5M1,5M2-B ):: DC(CAR1)=DC(CAR1)-1

1240 P1=SP1 :: P2=SP2-1

1250 A\*=D14\* :: GOSUB 2310 :: GOTO 1320

1260 IF SP2>27 THEN A\*=D13\* :: 80SU B 2310 :: BOTO 620

1270 CALL AR(SP1, SP2+1, Z, 1):: IF Z= 7 OR Z=B THEN A\$=D13\$ :: 605U8 2310 :: GOTO 620

1280 CALL SPRITE (#5,105,7,SM1,SM2+8 ):: DC(CAR1)=DC(CAR1)-1 :: P1= SP1 :: P2=SP2+1 :: GOTO 1250

1290 IF SP1>18 THEN A\*=D13\* :: GDSU B 2310 :: 60TO 620

1300 CALL AR(SP1+1,SP2,Z,1):: IF Z= 7 OR Z=8 THEN A\*=D13\* :: GOSUB 2310 :: GOTO 620

1310 CALL SPRITE(#5,105,7,SM1+8,SM2 ):: DC(CAR1)=DC(CAR1)~1 :: P1= SP1+1 :: P2=SP2 :: GOTO 1250

1320 TD=5 1330 DISPLAY AT (22,17):TD :: GOSUB 1750

1340 TD=TD-1 :: IF TD>-1 THEN 1330 1350 FOR EX=1 TO 10 :: CALL PATTERN (#5,120):: CALL PATTERN(#5,121 ):: CALL SOUND (500, INT (RND#-3) -4,0):: NEXT EX

1360 CALL DELSPRITE(#5):: IF ABS(SP 1-P1)<3 AND ABS(SP2-P2)<3 THEN 1740

1370 CALL AR(P1,P2,Z,1):: DRE=Z

1380 IF K<>BB THEN 1400 ELSE CALL H CHAR(P1+2,P2+2,128):: CALL AR( P1, P2, 8, 2)

1390 CALL HCHAR(P1+1,P2+2,128):: CA LL AR(P1-1,P2,8,2):: GOTO 1410

1400 CALL HCHAR(P1+2,P2+2,32):: CAL L AR(P1, P2, 7, 2)

1410 IF DRE<4 THEN A\*=D15\* :: GOSUB 2310 :: GOTO 620

1420 IF ORE>8 THEN GOLD#GOLD+ORE :: DISPLAY AT (24, 21): GOLD :: A\*= D16# :: SOSUB 2310 :: DISPLAY AT (22, 24): ORE

1430 IF DRE<=8 THEN 1450

1440 RESTORE 2270 :: FOR CS=1 TO 5 :: READ 65 :: CALL SOUND(200\*C S, GS, O):: NEXT CS :: 60T0 620

1450 IF DRE=4 THEN AS=D17\$ :: GOSUS 2310 :: GOTO 620

1460 CALL HCHAR (P1+2, P2+2, 136)

1470 A\$=D21\$ :: GOSUB 2310 :: CALL SOUND (1000, 110, 0, -8, 0) :: GOSUB 1750

1480 CALL SOUND (500, 110, 0, -5, 0) : : G **OSUB** 1750

1490 IF P2<=1 THEN 1500 ELSE CALL A R(P1,P2-1,Z,1):: IF Z=7 OR Z=8THEN 1520

1500 IF P2>27 THEN 1510 ELSE CALL A R(P1,P2+1,Z,1):: IF Z=8 OR Z=7 THEN 1580

1510 CALL HCHAR(P1+2,P2+2,136):: 80 TO 620

1520 P2=P2+1 :: CALL HCHAR(P1+2,P2+ 2,134):: GOSUB 1750

1530 CALL AR(P1,P2,5,2)

1540 IF P1=SP1 AND P2=SP2 THEN 2190 1550 IF P1=19 THEN 1560 ELSE CALL A R(P1+1,P2,Z,1):: IF Z=8 THEN 6 OTO 1640

1560 IF P2>0 THEN CALL AR(P1,P2-1,Z ,1):: IF Z=7 OR Z=8 THEN 1520

1570 CALL HCHAR(P1+2,P2+2,136):: BD TO 620

1580 P2=P2+1 :: CALL HCHAR(P1+2,P2+ 2,136):: GOSUB 1750

1590 CALL AR(P1, P2, 5, 2)

1600 IF P1=SP1 AND P2=SP2 THEN 2190 1610 IF P1=19 THEN 1620 ELSE CALL A

R(P1+1,P2,Z,1):: IF Z=8 THEN G OTO 1640

1620 IF P2<28 THEN CALL AR(P1,P2+1, Z,1):: IF Z=7 OR Z=8 THEN 1580

1630 CALL HCHAR(P1+2,P2+2,136):: GD TO 620

1640 P1=P1+1 :: CALL HCHAR(P1+2,P2+ 2,136):: GOSUB 1750

1650 CALL AR(P1, P2, 5, 2)

1660 IF P1=SP1 AND P2=SP2 THEN 2190 1670 IF P1=19 THEN 1680 ELSE CALL A

R(P1+1,P2,Z,1):: IF Z=8 THEN 1 640

1680 RANDOMIZE

1690 IF P2>27 DR P2<=1 THEN 1720

1700 CALL AR(P1,P2+1,Z,1):: CALL AR (P1, P2-1, Z1, 1):: IF (Z=7 OR Z= 8) AND (21=7 OR 21=8) THEN FL3=IN T(RND#2)+1

1710 IF FL3>0 THEN ON FL3 GOTO 1520 ,1580

1720 IF Z=7 OR Z=8 THEN 1580 ELSE I F Z1=7 OR Z1=8 THEN 1520

1730 CALL HCHAR(P1+2,P2+2,136):: GO TD 620

1740 DISPLAY AT(22,1):D22\*:D23\* :: **60TO 2200** 

1750 CALL KEY(0,K1,S1):: IF S1=0 OR S=-1 THEN RETURN

1760 IF K1=69 THEN GOSUB 730 :: RET URN

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- 1770 IF K1=83 THEN GOSUB 810 :: RET URN
- 1780 IF K1=68 THEN GOSUB 900 :: RET URN
- 1790 IF K1=88 THEN GOSUB 990 :: RET URN
- 1800 RETURN
- 1810 DISPLAY AT(23,1): "MINE IN WHAT DIRECTION?"
- 1820 CALL KEY(O, KE, SE):: IF SE#O TH EN 1820
- 1830 IF KE=83 THEN 1870
- 1840 IF KE=68 THEN 1970
- 1850 IF KE=88 THEN 2070
- 1860 CALL SOUND (100,550,0):: 60TO 1 810
- 1870 DISPLAY AT (24, 1) SIZE (16) : "MINE LEFT"
- 1880 IF SP2<2 OR SP1<1 THEN CALL SO UND (50, 220, 5):: GOTO 620
- 1890 CALL AR(SP1, SP2-1, 2, 1):: IF Z< >1 THEN 1920 ELSE CALL AR (SP1, SP2-1,7,2):: CALL HCHAR(SP1+2, SP2+1,32)
- 1900 SM2=SM2-8 :: SP2=SP2-1 :: CALL LOCATE(#1,SM1,SM2):: IF CAR⇒1 THEN CALL LOCATE (#CAR1, SM1, SM
- 1910 AS=D185 1: GOSUB 2310 :: GOTO 620
- 1920 IF Z=2 THEN A\$=D19\$ :: GOSUB 2 310 :: GOTO 620
- 1930 IF Z=3 THEN A\*=D20\* :: GOSUB 2 310 :: GOTO 620
- 1940 IF Z=7 OR Z=8 THEN DISPLAY AT( 22,1): "ALREADY MINED." :: GOTO **620**
- 1950 CALL HCHAR (SP1+2, SP2+1, 32):: 0 RE=Z :: IF Z>B THEN CALL AR (SP 1,SP2-1,7,2)
- 1960 Pi=SP1 :: P2=SP2-1 :: GOTO 142
- 1970 DISPLAY AT(24,1)SIZE(16): "MINE RIGHT"
- 1980 IF SP2>27 OR SP1<1 THEN CALL S OUND (50, 220, 5):: GDTD 620
- 1990 CALL AR(SP1, SP2+1, Z, 1):: IF Z< >1 THEN 2020 ELSE CALL AR(SP1, SP2+1,7,2):: CALL HCHAR(SP1+2, SP2+3,32)
- 2000 SM2=SM2+8 :: SP2=SP2+1 :: CALL LOCATE(#1,SM1,SM2):: IF CAR=1 THEN CALL LOCATE (#CAR1, SM1, SM 2)
- 2010 A\$=D18\$ :: GOSUB 2310 :: GOTO 620
- 2020 IF Z=2 THEN A\*=D18\* :: G09UB 2 310 :: GOTO 620
- 2030 IF Z=3 THEN A\$=D19\$ :: GOSUB 2 310 :: GOTO 620

- 2040 IF Z=7 OR Z=8 THEN DISPLAY AT ( 22,1): "ALREADY MINED." :: GOTO
- 2050 CALL HCHAR(SP1+2, SP2+3, 32):: 0 RE=Z :: IF Z>8 THEN CALL AR(SP 1,5P2+1,7,2)
- 2060 P1=SP1 :: P2=SP2+1 :: GQTQ 142
- 2070 DISPLAY AT (24, 1) SIZE (16) : "MINE DOWN. "
- 2080 IF SP1=19 THEN CALL SOUND (50,2 20,5):: GDTD 620
- 2090 CALL AR(SP1+1,SP2,Z,1):: IF Z( >1 THEN 2130 ELSE CALL AR(SP1+ 1, SP2, B, 2):: CALL HCHAR (SP1+3. SP2+2, 128)
- 2100 SP1=SP1+1 :: SM1=SM1+8 :: CALL LOCATE(#1,SM1,SM2):: IF CAR=1 THEN CALL LOCATE (#CAR1, SM1, SM
- 2110 A\$=D18\$ :: 60SUB 2310 :: IF SP 1<1 THEN GOTO 620
- 2120 CALL AR(SP1-1,SP2,8,2):: CALL HCHAR (SP1+1, SP2+2, 128):: GOTO 620
- 2130 IF Z=2 THEN A\$=D19\$ :: GOSUB 2 310 :: GOTO 620
- 2140 IF Z=3 THEN A\*=D20\* :: GOSUB 2 310 :: **60**TO 620
- 2150 IF Z\*7 THEN CALL AR (SP1+1, SP2, 8,2):: CALL HCHAR(SP1+3,SP2+2, 128):: GOTO 620
- 2160 IF Z=8 THEN DISPLAY AT (22,1):" ALREADY MINED" :: GOTO 620
- 2170 CALL VCHAR(SP1+2,SP2+2,128,2): : ORE=Z :: IF Z>8 THEN CALL AR (SP1+1,8P2,8,2):: CALL AR(SP1, SP2.8.2)
- 2180 P1=SP1+1 :: P2=SP2 :: GOTO 142
- 2190 DISPLAY AT (22,1): "YOUR DEAD!" :: CALL SOUND (2000, 220, 0):: CA LL SOUND (4000, 110, 0)
- 2200 CALL DELSPRITE (ALL): DISPLAY AT(23,13): "SCORE: "; GOLD :: DIS PLAY AT (24, 1): "PLAY AGAIN(Y/N)
- 2210 ACCEPT AT (24, 17) VALIDATE ("YN") :PA\$ :: IF PA\$="Y" THEN SCORE= 0 :: CAR=0 :: GOTO 160 ELSE CA LL CLEAR :: STOP
- 2220 DATA 2,9,GOLD RUSH,4,5,BY W. K . BALTHROP, 24, 1, PRESS ANY KEY TO BEGIN
- 2230 DATA 12,7,STANDBY PLEASE 2240 DATA 1,1,LEVEL OF DIFFICULTY: 3,3,1.MINE COOK,5,3,2.MINER'S HELPER, 7, 3, 3. APPRENTICE MINER,

9,3,4.MINER

Continued on p. 64



presents

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Tex-Seribe ... from p.17 920 L\_PROMPTS=STR\$(B) 930 GOSUB 2890 940 L=L+1 950 FOR I=L TO B+1 STEP -1 960 A\$(I)=A\$(I-1) **970 NEXT I** 980 A\$(B)=INPUT\$ 990 PRINT :"Line added, file renumb ered": : 1000 RETURN 1010 REM --- REPLACE A LINE 1020 REM 1030 CALL SCREEN(10) 1040 IF L>0 THEN 1070 1050 PRINT :" \*\*\* FILE EMPTY \*\*\*": 1060 GOTO 1150 1070 PRINT : "Replace" 1080 GOSUB 3030 1090 IF B=0 THEN 1150 1100 PRINT : "Enter replacement line 1110 L\_PROMPT\$=STR\$(B) 1120 GOSUB 2890 1130 A\$(B) = INPUT\$ 1140 PRINT :"Line replaced": : 1150 RETURN 1160 REM --- CLEAR FILE IN MEMORY 1170 FOR I=1 TO L 1180 A\$(I)="" 1190 NEXT I 1200 L≖0 1210 PRINT : :"-- MEMORY WORK AREA CLEARED": : 1220 RETURN 1230 REM --- ADD LINES TO FILE 1240 REM 1250 CALL SCREEN(16) 1260 REM 1270 REM 1280 CALL CLEAR 1290 PRINT : : : "--- Ready for typi (enter ^^ to exi กฐ --t)":: 1300 L\_PROMPT = STR \$ (L+1) 1310 GOSUB 2890 1320 IF LEN(INPUT\$)<>4 THEN 1340 1330 IF SEG\$(INPUT\$,1,2)="^^" THEN 1370 1340 L=L+1 1350 A\$(L) #INPUT\$ 1360 GOTO 1300 1370 RETURN 1380 REM --- SAVE FILE 1390 REM 1400, CALL SCREEN(12) 1410 IF L>O THEN 1440 1420 PRINT : :" \*\*\* FILE EMPTY \*\*\*\* 2 : 1430 GDTO 1570 1440 PRINT: : "Enter range of file to save.": :

1450 GUSUB 3160 1460 PRINT 1470 INPUT "SAVE to 2=disk:":DEV 1∞cassette 1480 IF DEV<>1 THEN 1510 1490 GDSUB 3450 1500 GOTO 1570 1510 IF DEV<>2 THEN 1540 1520 GOSUB 3450 1530 GOTO 1570 1540 PRINT 1550 CALL SOUND (500, 220, 1, 659, 1) 1560 GOTO 1470 1570 RETURN 1580 REM --- LIST FILE SOURCE 1590 REM 1600 CALL SCREEN(6) 1610 PRINT : "Enter the range of fil source lines to print-": 1620 GOSUB 3160 1630 PRINT : : : 1640 INPUT "Output to screen or pri (P/S)":P\$ nter? 1650 PRINT : : : 1660 IF (P\$="P")+(P\$="p")=-1 THEN 1 730 1670 FOR I=A TO B 1680 S≖I 1690 GOSUB 2740 1700 PRINT 1;S\$ 1710 NEXT I 1720 GOTO 1930 1730 PRINT: : : \* \*\*\* PRINTING SOUR CE \*\*\*": : : 1740 REM \$ \*\*\*\*\*\*\*\*\*\*\*\* \$\$\$\$\$\$ 1750 OPEN #1: "RS232.DA=8.BA=9600", V ARIABLE 132 1760 REM \$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$ 5555555555555555555555555555 \$\$\$\$\$\$ 1770 PRINT #1:RESETDEPSON\$ 1780 REM \$ \*\*\*\*\*\*\*\*\*\*\*\* \$\$\$\$\$\$ 1790 REM == PUT PRINTER IN CONDENSE D PRINT MODE == 1800 REM \$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$ \$\$\$\$\$\$ 1810 PRINT #1:CHR\$(15) 1820 REM \$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$ \$\$\$\$\$\$ 1830 FOR I=A TO B 1840 S=I 1850 GOSUB 2740 1860 PRINT #1:I:5\$ 1870 NEXT I 1880 REM == PUT PRINTER BACK TO NO RMAL ==

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\$\$\$\$\$\$

555555

1920 CLOSE #1

1930 RETURN

1950 REM

1910 REM \$\$\$\$\$\$\$\$

1900 PRINT #1:CHR\$(18)

1940 REM --- LOAD A FILE

1980 CALL SOUND (500, 220, 1, 659, 1)

1990 PRINT : : "\*\*\* FILE HAS DATA

2000 PRINT " Enter ""C"" to CLEAR #

2020 IF (CH\$="C")+(CH\$="c")=0 THEN

2050 IF (CH\$="M")+(CH\$="m")=-1 THEN

2060 CALL SOUND(500,220,1,659,1)

2170 CALL SOUND (500, 220, 1, 659, 1)

2210 REM --- REPLACE A STRING

2240 PRINT : "String to be replaced"

2270 R\$=SEG\$(INPUT\$,1,(LEN(INPUT\$)-

2300 PRINT : "CAN'T REPLACE NULL STR

2330 PRINT : "Enter replacement stri

2100 INPUT "LOAD/MERGE from:

2110 IF DEV<>1 THEN 2140

2140 IF DEV<>2 THEN 2170

IN IT. ":

Enter ""M"" to MERGE n

1=cassette 2=disk -?"

1960 CALL SCREEN(12)

ALREADY

ew file"

ile

2010 INPUT CH\$

2050

2040 GOTO 2090

208Q GOTO 2000

: DEV

2120 GOSUB 3360

2150 GOSUB 3540

2160 GOTO 2200

2190 GOTO 2100

2230 CALL SCREEN(10)

2290 IF D>O THEN 2320

2250 L\_PROMPT\$="?"

2260 GOSUB 2890

2))

2310 RETURN

ng"

2340 GOSUB 2890

2320 N=0

2280 D=LEN(R\$)

ING": :

**2180 PRINT** 

2200 RETURN

2220 REM

2130 GOTO 2200

**2070 PRINT** 

2090 PRINT

2030 GOSUB 1160

2090

1970 IF L=0 THEN 2090



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2350 N#=SEG#(INPUT#,1,(LEN(INPUT#)-

2)) 2360 PRINT : "Enter search range."

2370 GOSUB 3160 2380 PRINT : :" \*\*\* SEARCHING \*\*\*\*:

2390 FOR K=A TO B

2400 IF LEN(A\$(K)) < D THEN 2510

2410 CPOS=POS(A\$(K),R\$,1)

2420 IF CPOS=0 THEN 2510

2430 T\*(1) = SEG\*(A\*(K), 1, CPOS-1)

2440 T\*(2) = SEG\*(A\*(K), CPOS+D, 132)

2450 A\$(K)=T\$(1)&N\$&T\$(2)

2460 N=N+1

2470 PRINT "Changed line"; K; "to-"

2480 S≃K

2490 GOSUB 2740

2500 PRINT S\$: 2510 NEXT K

2520 PRINT : :N; "changes made.": :

2530 RETURN

2540 REM --- PRINT TEXT FROM FILE

2550 REM 2560 CALL SCREEN(6)

2570 PRINT :"Enter line range to pr

int-":

2580 GDSUB 3160

2590 PRINT : :" \*\*\* PRINTING TEXT

\*\*\*": : 2600 REM \$\$\$\$\$\$\$\$\$\$\$\$\$

5555555555555555555555555 555555

2610 OPEN #1: "RS232.DA=8.BA=9600.CR .LF", VARIABLE 132

2620 REM \$ 5555555555555555555555555

\$\$\$\$\$\$ 2630 REM

2640 REM \$ 5555555555555555555555555555

\$\$\$\$\$\$

2650 PRINT #1:RESET@EPSON\$

2660 REM \$ \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* \$\$\$\$\$\$

2670 REM

2680 FOR I=A TO B

2690 PRINT #1:A\$(I)

2700 NEXT I 2710 CLOSE #1

2720 REM

2730 RETURN

2740 REM --- FORMAT SOURCE OUTPUT

2750 REM

2760 S\$=A\$(S)

2770 LS=LEN(S\$) 2780 FOR 0=1 TO LS

2790 P=ASC(SEG\$(A\$(S),0,1))+1

2800 IF PK33 THEN 2830

2810 IF P<130 THEN 2870

2820 P=P-128

Continued on p. 54

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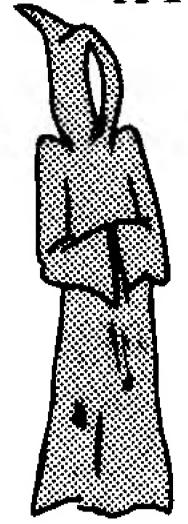
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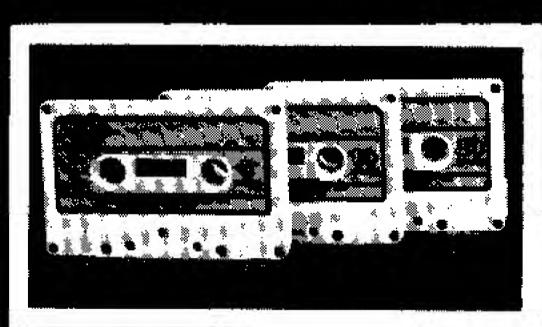
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3190 PRINT : "Enter the first line n

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### Tex-Schibe...from p.53

3130 GOSUB 2760

s";L:

3140 PRINT 5\$

3150 RETURN

3170 REM

	30.00300000 P13-3
2830	TS=LEN(S\$)
2840	LM=LS-O
	PM=TS-LM
2860	S\$=SEG\$(S\$,1,(PM-1))&C\$(P)&SEG
	\$(S\$,(PM+1),LM)
2870	NEXT O
2880	RETURN
2890	REM INPUT FROM KEYBOARD
2900	REM
2910	INPUT\$=""
2 <b>92</b> 0	LINPUT L_PROMPT\$&"-":INPUT\$
2930	IF LEN(INPUT\$) < WIDTH THEN 3010
2940	PRINT : "*** LINE TOO LONG ***"
	: :
2950	CALL SOUND (500, 220, 1, 659, 1)
2960	FOR W=WIDTH TO 1 STEP -1
2970	IF SEG\$(INPUT\$, W, 1)=" " THEN 2
	990
2980	NEXT W
2990	INPUT\$=SEG\$(INPUT\$,1,W)
3000	PRINT L_PROMPT\$&"-"&INPUT\$
3010	INPUT\$=INPUT\$&LFCR\$
	RETURN
3030	REM FIND AND DISPLAY LINE
	SUBROUTINE
3040	
	PRINT
	INPUT "Line number?":B
3070	IF $(B)-1+(B((L+1))=-2$ THEN 31
	00
3080	PRINT : :" *** NO SUCH LINE **
7000	*": :
	GDTD 3060
	IF B=0 THEN 3150
3110	PRINT : "Old line"; B; "reads -":
T. 00	: 
3120	2=8

3160 REM ---GET RANGE SUBROUTINE

3180 PRINT "The last line in file i

Umber," 3200 INPUT "(Enter zero for whole ile):":A 3210 IF A>O THEN 3250 3220 A=1 3230 B=L 3240 GOTO 3350 3250 IF (A>O)+(A <l+1)=-2 (a="" 3250="" 3280="" if="" then="">O)+(A<l+1)=-2 ***="" 3260="" 3280="" :"="" number="" of="" out="" print="" rame<="" th="" then=""><th>ł</th><th>3170</th><th>TRINI : Enter the Tibe line it</th></l+1)=-2></l+1)=-2>	ł	3170	TRINI : Enter the Tibe line it
ile):":A 3210 IF A>O THEN 3250 3220 A=1 3230 B=L 3240 GOTO 3350 3250 IF (A>O)+(A <l+1)=-2 "enter="" ***="" ***":="" 3180="" 3260="" 3270="" 3280="" 3290="" 3300="" b="" ge="" goto="" if="" input="" last="" line="" number="" number:":b="" of="" out="" print="" print:"="" rai="" the="" then="">A THEN 3330 3310 B=A 3320 GOTO 3350 3330 IF B<l #1="" #1:"cs1",="" #1:((b+i)-a)="" #1:a\$(i)="" #1:a\$(i)::="" #1:x="" 192="" 3340="" 3350="" 3360="" 3370="" 3380="" 3390="" 3400="" 3410="" 3420="" 3430="" 3440="" 3450="" 3460="" 3470="" 3480="" 3490="" 3500="" 3510="" 3520="" 3530="" 3540="" 3550="" ::="" b="" cassette="" close="" disk="" fixed="" for="" i="" input="" internal,="" l="L+1" ll="L" load="" ne="" next="" open="" output="" print="" rem="" rem<="" return="" save="" subrout="" subroutine="" th="" then="" to="" x+ll=""><th></th><th></th><th>umber,"</th></l></l+1)=-2>			umber,"
3210 IF A>O THEN 3250 3220 A=1 3230 B=L 3240 GOTO 3350 3250 IF (A>O)+(A <l+1)=-2 ":="" "enter="" *="" ***="" ***":="" 3180="" 3260="" 3270="" 3280="" 3290="" 3300="" 8="" b="" ber:="" ge="" goto="" if="" input="" last="" line="" num="" number="" of="" out="" print="" print:="" rai="" the="" then="">A THEN 3330 3310 B=A 3320 GOTO 3350 3330 IF B<l "cs1",="" #1="" #1:="" ((b+i)-a)="" 192="" 3340="" 3350="" 3360="" 3370="" 3380="" 3390="" 3400="" 3410="" 3420="" 3430="" 3440="" 3450="" 3460="" 3470="" 3480="" 3490="" 3500="" 3510="" 3520="" 3530="" 3540="" 3550="" ::="" a\$(i)="" a\$(i)::="" b="" cassette="" close="" disk="" fixed="" for="" i="" input="" internal,="" l="L+1" ll="L" load="" ne="" next="" open="" output="" print="" rem="" rem<="" return="" save="" subrout="" subroutine="" th="" then="" to="" x="" x+ll=""><th></th><th>3200</th><th></th></l></l+1)=-2>		3200	
3220 A=1 3230 B=L 3240 GOTO 3350 3250 IF (A>O)+(A <l+1)=-2 "enter="" ***="" ***":="" 3180="" 3260="" 3270="" 3280="" 3290="" 3300="" :"="" b="" ge="" goto="" if="" input="" last="" line="" number="" number:":8="" of="" out="" print="" rai="" the="" then="">A THEN 3330 3310 B=A 3320 GOTO 3350 3330 IF B<l #1="" #1:"cs1",="" #1:((b+1)-a)="" #1:a\$(i)="" #1:a\$(i)::="" #1:x="" 192="" 3340="" 3350="" 3360="" 3370="" 3380="" 3390="" 3400="" 3410="" 3420="" 3430="" 3440="" 3450="" 3460="" 3470="" 3480="" 3490="" 3500="" 3510="" 3520="" 3530="" 3540="" 3550="" ::="" b="" cassette="" close="" disk="" fixed="" for="" i="" input="" internal,="" l="L+1" ll="L" load="" ne="" next="" open="" output="" print="" rem="" rem<="" return="" save="" subrout="" subroutine="" th="" then="" to="" x+ll=""><th>1</th><th></th><th>ile):":A</th></l></l+1)=-2>	1		ile):":A
3230 B=L 3240 GOTO 3350 3250 IF (A>O)+(A <l+1)=-2 "="" ***="" 3260="" 3280="" number="" of="" out="" print:="" rai<="" th="" then=""><th>ŀ</th><th>3210</th><th>IF A&gt;O THEN 3250</th></l+1)=-2>	ŀ	3210	IF A>O THEN 3250
3240 GOTO 3350 3250 IF (A>O)+(A <l+1)=-2 "="" ":8="" "enter="" ***="" ***":="" 3180="" 3260="" 3270="" 3280="" 3290="" 3300="" b="" ge="" goto="" if="" input="" last="" line="" number="" number:="" of="" out="" print="" print:="" rai="" the="" then="">A THEN 3330 3310 B=A 3320 GOTO 3350 3330 IF B<l "cs1",="" #1="" #1:="" #1:4\$(i)="" #1:a\$(i)::="" #1:x="" ((b+1)-a)="" 192="" 3340="" 3350="" 3360="" 3370="" 3380="" 3390="" 3400="" 3410="" 3420="" 3430="" 3440="" 3450="" 3460="" 3470="" 3480="" 3490="" 3500="" 3510="" 3520="" 3530="" 3540="" 3550="" ::="" b="" cassette="" close="" disk="" fixed="" for="" i="" input="" internal,="" l="L+1" ll="L" load="" ne="" next="" open="" output="" print="" rem="" rem<="" return="" save="" subrout="" subroutine="" th="" then="" to="" x+ll=""><th></th><th>3220</th><th>A=1</th></l></l+1)=-2>		3220	A=1
3250 IF (A>O)+(A <l+1)=-2 "="" ":="" "enter="" ***="" ***":="" 3180="" 3260="" 3270="" 3280="" 3290="" 3300="" 8="" :="" b="" ge="" goto="" if="" input="" last="" line="" number="" number:="" of="" out="" print="" print:="" rai="" the="" then="">A THEN 3330 3310 B=A 3320 GOTO 3350 3330 IF B<l "cs1",="" #1="" #1:="" ((b+1)-a)="" (4b+1)-a)="" 192="" 3340="" 3350="" 3360="" 3370="" 3380="" 3390="" 3400="" 3410="" 3420="" 3430="" 3440="" 3450="" 3460="" 3470="" 3480="" 3490="" 3500="" 3510="" 3520="" 3530="" 3540="" 3550="" ::="" a\$(i)="" a\$(i)::="" b="" cassette="" close="" disk="" fixed="" for="" i="" input="" internal,="" l="L+1" ll="L" load="" ne="" next="" open="" output="" print="" rem="" rem<="" return="" save="" subrout="" subroutine="" th="" then="" to="" x="" x+ll=""><th></th><th>3230</th><th>B=L</th></l></l+1)=-2>		3230	B=L
3260 PRINT: " *** NUMBER OUT OF RAI     GE ***": :  3270 GOTD 3180 3280 PRINT 3290 INPUT "Enter the last line num     ber: ": 8  3300 IF B>A THEN 3330 3310 B=A 3320 GOTD 3350 3330 IF B <l "cs1",="" #1="" #1:="" #1:a\$(i)="" #1:a\$(i)::="" #1:x="" ((b+1)-a)="" 192="" 3340="" 3350="" 3360="" 3370="" 3380="" 3390="" 3400="" 3410="" 3420="" 3430="" 3440="" 3450="" 3460="" 3470="" 3480="" 3490="" 3500="" 3510="" 3520="" 3530="" 3540="" 3550="" ::="" b="" cassette="" close="" disk="" fixed="" for="" i="" input="" internal,="" l="L+1" ll="L" load="" ne="" next="" open="" output="" print="" rem="" rem<="" return="" save="" subrout="" subroutine="" th="" then="" to="" x+ll=""><th></th><th>3240</th><th>GOTO 3350</th></l>		3240	GOTO 3350
GE ***": : 3270 GGTG 3180 3280 PRINT 3290 INPUT "Enter the last line number: ":8 3300 IF B>A THEN 3330 3310 B=A 3320 GGTG 3350 3330 IF B <l "cs1",="" #1="" #1:="" #1:((b+1)-a)="" #1:a\$(i)="" #1:a\$(i)::="" #1:x="" 192="" 3340="" 3350="" 3360="" 3370="" 3380="" 3390="" 3400="" 3410="" 3420="" 3430="" 3440="" 3450="" 3460="" 3470="" 3480="" 3490="" 3500="" 3510="" 3520="" 3530="" 3540="" 3550="" ::="" b="" cassette="" close="" disk="" fgr="" fixed="" i="" input="" internal,="" l="L+1" lgad="" ll="L" load="" ne="" next="" open="" output="" print="" rem="" rem<="" return="" save="" subrout="" subroutine="" th="" then="" to="" x+ll=""><th></th><th>3250</th><th>IF (A&gt;0)+(A<l+1)=-2 3280<="" th="" then=""></l+1)=-2></th></l>		3250	IF (A>0)+(A <l+1)=-2 3280<="" th="" then=""></l+1)=-2>
3270 GOTO 3180 3280 PRINT 3290 INPUT "Enter the last line number:":8 3300 IF B>A THEN 3330 3310 B=A 3320 GOTO 3350 3340 B=L 3350 RETURN 3360 REM CASSETTE LOAD SUBROUT NE 3370 REM 3380 OPEN #1:"CS1", INTERNAL, INPUT FIXED 192 3390 INPUT #1:X :: LL=L 3400 FOR I=LL+1 TO X+LL 3410 INPUT #1:A\$(I):: L=L+1 3420 NEXT I 3430 CLOSE #1 3440 RETURN 3450 REM CASSETTE SAVE SUBROUT NE 3460 REM 3470 OPEN #1:"CS1", INTERNAL, OUTPUT FIXED 192 3480 PRINT #1:((B+1)-A) 3490 FOR I=A TO B 3500 PRINT #1:4\$(I) 3510 NEXT I 3520 CLOSE #1 3530 RETURN 3540 REM DISK LOAD SUBROUTINE 3550 REM		3260	PRINT: * *** NUMBER OUT OF RAN
3280 PRINT 3290 INPUT "Enter the last line number:":8 3300 IF B>A THEN 3330 3310 B=A 3320 GOTO 3350 3330 IF B <l #1="" #1:"cs1",="" #1:((b+1)-a)="" #1:a\$(i)="" #1:a\$(i)::="" #1:x="" 192="" 3340="" 3350="" 3360="" 3370="" 3380="" 3390="" 3400="" 3410="" 3420="" 3430="" 3440="" 3450="" 3460="" 3470="" 3480="" 3490="" 3500="" 3510="" 3520="" 3530="" 3540="" 3550="" ::="" b="" cassette="" close="" disk="" fixed="" for="" i="" input="" internal,="" l="L+1" ll="L" load="" ne="" next="" open="" output="" print="" rem="" rem<="" return="" save="" subrout="" subroutine="" th="" then="" to="" x+ll=""><th></th><th></th><th>GE ***": :</th></l>			GE ***": :
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3560 GOSUB 3750		3550	REM
<u> </u>		3560	GDSUB 3750
		<u>.                                    </u>	<u> </u>

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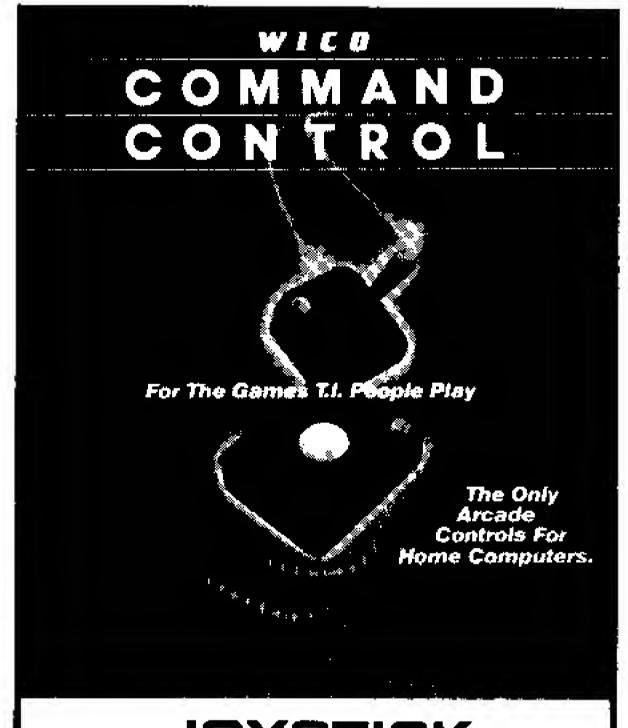
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3570 OPEN #1: "DSK"&STR\*(DISK)&". "&F ILE\*, INPUT , SEQUENTIAL, INTERNA L. VARIABLE 254 3580 INPUT #1:X 3590 LL.≖L 3600 FOR I=LL+1 TO X+LL 3610 INPUT #1:A\$(I):: L=L+1 3620 NEXT I 3630 CLOSE #1 3640 RETURN 3650 REM --- DISK SAVE SUBROUTINE 3660 REM 3670 GOSUB 3750 3680 OPEN #1: "DSK"&STR\$ (DISK)&". "&F ILE\*, OUTPUT, SEQUENTIAL, INTERNA L, VARIABLE 234 3670 PRINT #1:((B+1)-A) 3700 FOR I≃A TO B 3710 PRINT #1:As(I) 3720 NEXT I 3730 CLOSE #1 3740 RETURN 3750 REM --- DISK FILE SELECT SUBRO UTINE 3760 REM 3770 PRINT 3780 INPUT "Which disk 1,2, or 3?": DISK 3790 IF (DISK<1)+(DISK>3)=0 THEN 38 30 3800 PRINT 3810 CALL SOUND (500, 220, 1, 659, 1) 3820 GOTO 3780 3830 PRINT : : "ENGAGE " "ALPHA LOCK

3840 INPUT "characters:":FILE\* 3850 IF (LEN(FILE\$)<1)+(LEN(FILE\$)> 10)=0 THEN 3890 3860 PRINT 3870 CALL SDUND (500, 220, 1, 659, 1) 3880 60TO 3830 3890 RETURN 3900 REM --- ERROR HANDLING AND REC OVERY SUBROUTINE 3910 REM 3920 ON ERROR 3980 :: CALL ERR (ECOD E, ZAP) 3930 CALL SOUND (500, 110, 1, 220, 1, 459 ,1) 3940 IF ECODE=39 DR ECODE=40 THEN 3 950 ELSE 3960 3950 A\$(L)="" :: A\$(L-1)="" :: A\$(L -2)="" :: A\$(L-3)="" :: A\$(L-4 )="" :: L=L-4 :: PRINT : :MEM\$ :: GOTO 4000 3960 IF ECODE>82 AND ECODE<131 THEN PRINT : : "<<< SORRY, I/O ERRO R >>>" :: GOTO 4000 3970 PRINT : :"<<< WEIRDO ERROR 0#% ! >>>" \*: GOTO 4000 3980 CALL ERR(ECODE, ZAP, ZIP, SPOT) 3990 PRINT "ERROR"; ECODE; "IN LINE"; SPOT 4000 DN ERROR 4020 4010 CLOSE #1 :: GOTO 4030 4020 CALL ERR(ECODE, ZAP) 4030 RETURN 580 4040 CALL CLEAR



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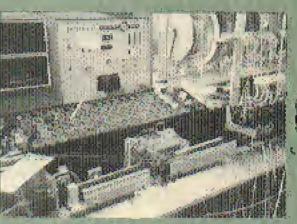
# SANTA'S WORKSHOP The Making of a Home Computer



1. (Sunta's auxiliary workshop (Texas branch). . .



Ouce Inside, our Elfin guide leads as down a half-mile hallway to the start of the Home Computer production line.



3. Here, each little component is carefully tested by a big computer before it becomes part of a Home Computer.



4. Sunta uses many computerleed tools in this longe workshop (Elves 'can't do everything). Here the wires, of the smallest parts are pushed into circuit boards.



5. Another robot inserts the wire leads of some larger parts in the printed circuit boards.



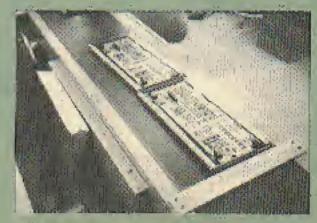
Not all Sunta's helpers are robots. A.



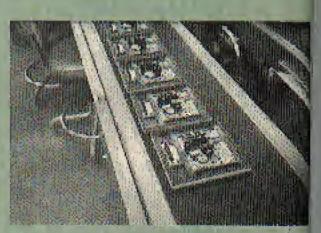
7. Look at all the people! Each one is putting parts in either the main or the power supply printed circuit boards.



8. The end of the line. All the parts are in place, ready for soldering,

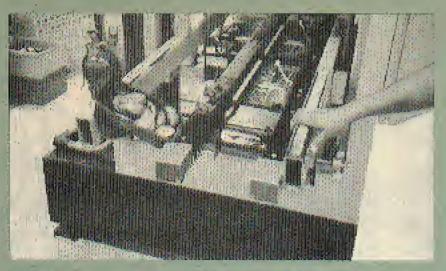


9. The main boards for the computer's circuitry, are ready for the "flow soldering" machine.

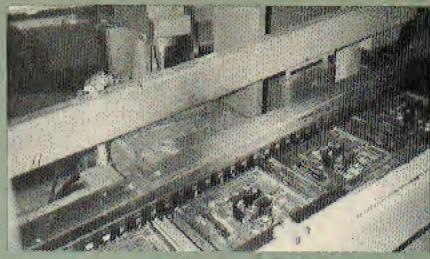


10. The power supply circuit boards are ready too!





11. The boards go onto the moving rack of the huge soldering machine.



12. Now the boards pass over a hot river of solder, and all connections are made simultaneously!



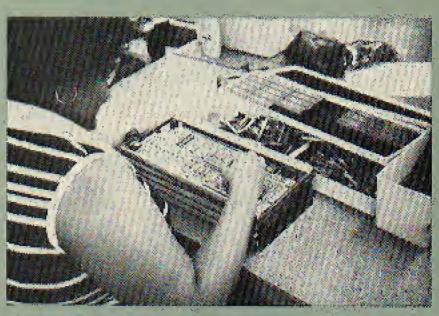
13. After the "metal river" ride, all boards receive a bath (to remove Solder flux).



14. Talk about being pampered! After their bath, these lucky boards are individually dried. . .



15. With even more "TLC," they are treated to a thorough check with a hand soldered fouch-up, if needed.



16. Now is the time to plug in the main computer "chips". including the "glant" TMS9900 microprocessor chip.



17. Santa's helpers test the main board for open or shorted connections.



powered up for the first time.



19. At the same time, the power supply printed circuit board is tested separately. . .



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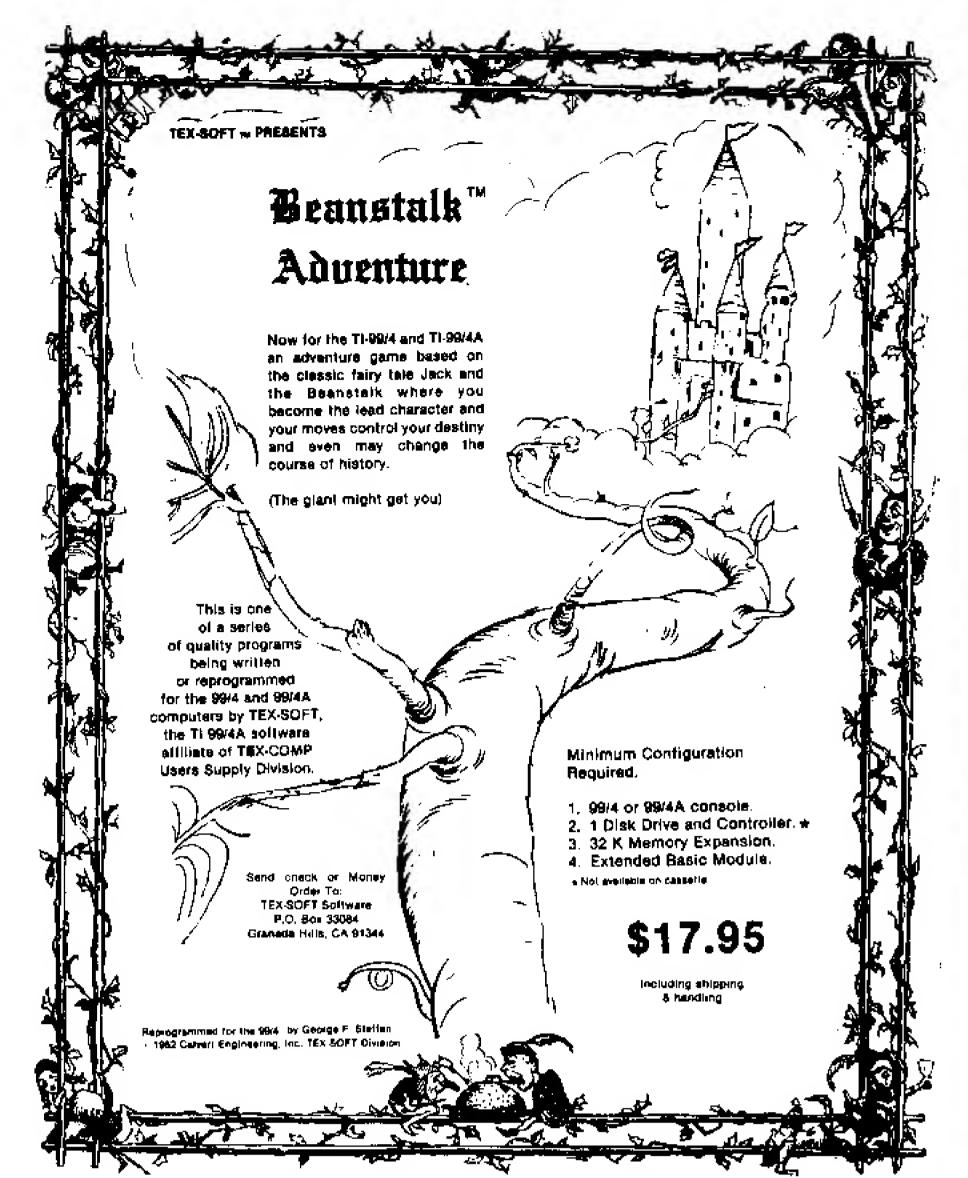
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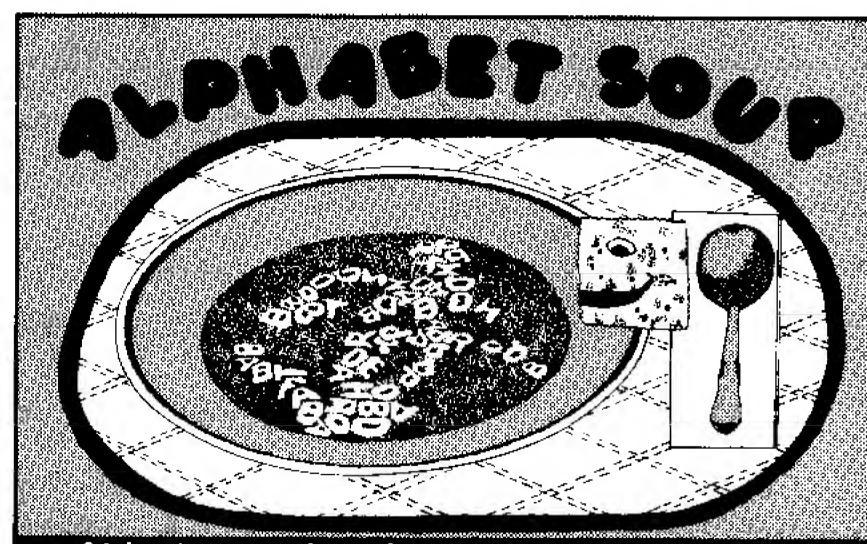
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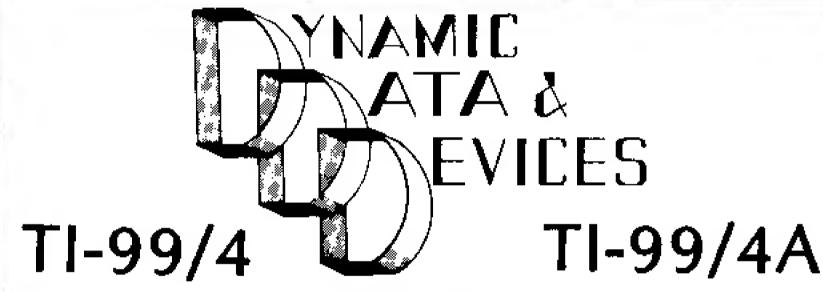
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20: . . . Now, together at last, they are put to the test . . .



21. Boards are shielded in metal to prevent possible TV interference.



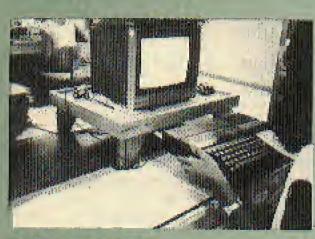
22. The power supply board goes in the case . . .



23. . . . then the main board with the computer itself.



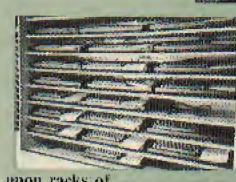
24. Now the keyboard . . .



26. The completed home computer gets a "drop test."



27. Then trial by fire . . . racks upon racks of



25. . . and finally the bottom of the case.



28. And again each console is fully tested!



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29. Here Santa's helpers make sure each key works correctly:



30. All those that meet Texas Instruments standards get "spiffy" brushed aluminum trim.



31. Each new TI Home Computer is carefully packed for that long Christmas Eve journey.





99'er Magazine December 1982





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### Plotting...from p.20

for some reason, such as loading some other program into the Mini-Memory. Therefore, once it has been loaded, do not invoke the CALL INIT routine! Make sure that no other data is loaded into the Mini-Memory or the lower part of the memory in the Memory Expansion (HEX 2800 to HEX 3000). If the program needs to be loaded into the Mini-Memory, this can be done in one of two ways:

### Method 1:

To assemble and load from the program listings-

- Plug the Editor/Assembler cartridge into the TI-99/4A.
- Using the Editor, enter the program segment in Listing 1 called BIT1. Save the text entered on a disk file called BIT1.
- Create disk file BIT2 using Listing 2 as in step 2.
- 4. Create disk file BIT3 using Listing 3 as in step 2.
- Create disk file BIT4 using Listing 4 as in step 2.
- 6. Create disk file SOURCE using Listing 5 as in step 2.
- 7. Execute the assembler on disk file SOURCE. Direct the object code to disk file GRAPHICS. Use Assembler option R (plus L and S options, if you have a printer).
- Remove the Editor/Assembler cartridge and insert the Mini-Memory cartridge.
- Put the disk containing the file GRAPHICS into disk 1.
- 10. Select the Mini-Memory from the main menu.
- II. Select the RE-INITIALIZE option and then press PROCEED.
- 12. Select the LOAD AND RUN option.
- Under file name type DSK1.GRAPHICS.
- 14. When the routine asks for another file name press QUIT.

The routine is now loaded into the Mini-Memory. [For detailed information on the Editor/Assembler, consult the Tl Editor/Assembler manual—Ed.]

### Method 2:

To load from the 99'er Magazine-on-Tape cassette, follow the instructions below-

- Plug Mini-Memory into the TI-99/4A.
- Select the EASY BUG option from the main menu.
- Press any key.
- Press L when a question mark appears.
- Put the cassette containing the package into the player.
- Follow the instructions on the screen.
- When a question mark reappears press QUIT.

The routines need the Memory Expansion for a 6K buffer in addition to the space in the Mini-Memory. If the Memory Expansion is not properly attached a blank screen will appear when the GRAPH routine is invoked.

### Example BASIC Programs

The following example will scale the screen so the Xmin is -1, the Xmax is 1, the Ymin is -0.75, and the Ymax is 0.75. The axes will cover the length and height of the screen and intersect at the center. A box will be drawn around the center and the statement "This is a test!" will appear at the bottom of the screen.

- 100 REM \*\*PLOTTING TEST ROUTINE
- 110 REM
- 120 REM 99'er Mag.
- 130 CALL LINK("GCLEAR")
- 140 A = .75
- 160 CALL LINK("SCALE", -1,B, -.75,A)
- 170 CALL LINK("XAXIS", -1,B,0)
- 180 CALL LINK("YAXIS", -.75,A,0)
- CALL LINK("MOVE",.5,.375) 200 CALL LINK("DRAW", .5, -.375)
- 210 C = -.5
- 220 CALL LINK("DRAW", C, -.375)
- 230 CALL LINK("DRAW", C, .375)
- 240 CALL LINK("DRAW",.5,.375)
- 250 A\$ = "This is a test!"
- 280 CALL LINK("MOVE", -1, -.75)
- 290 CALL LINK("LABEL", A\$)
- CALL LINK("GRAPH")

The TI BASIC program following creates a box drawn in perspective on the TI-99/4A screen.

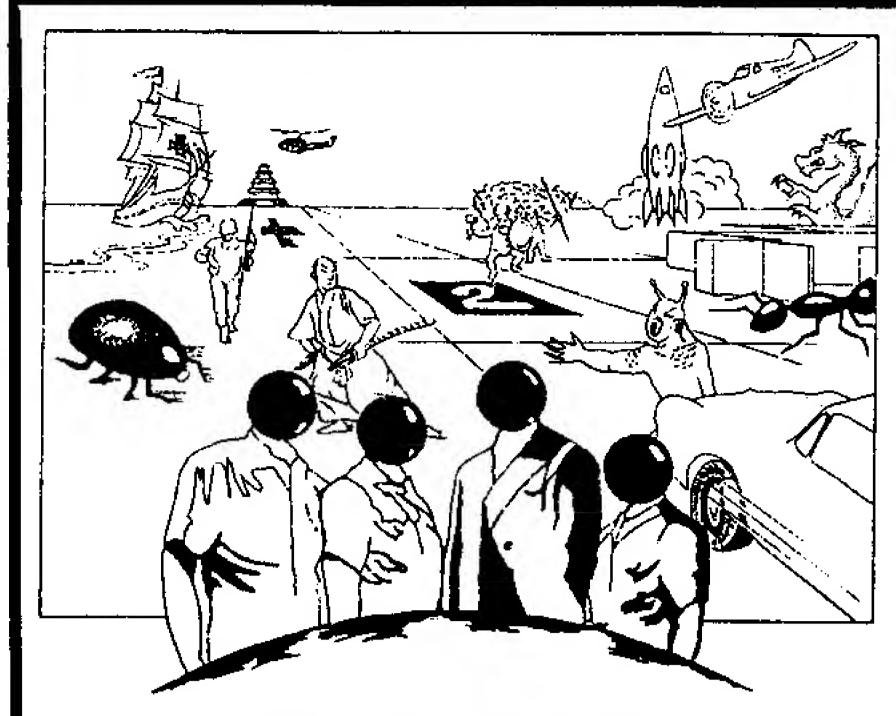
```
100 REM ** 3-D BOX **
110 REM
120 REM 99'er Magazine
130 CALL LINK("GCLEAR")
140 CALL LINK("SCALE",0,10,0,20)
150 CALL LINK("MOVE",2,8)
160 CALL LINK("DRAW", 2,13)
170 CALL LINK("DRAW",7,13)
180 CALL LINK("DRAW",7,8)
190 CALL LINK("DRAW", 2,8)
200 CALL LINK("MOVE",7,13)
210 CALL LINK("DRAW", 8, 15)
220 CALL LINK("DRAW", 3,15)
230 CALL LINK("DRAW",2,13)
240 CALL LINK("MOVE", 8,15)
250 CALL LINK("DRAW", 8, 10)
260 CALL LINK("DRAW",7,8)
270 CALL LINK("MOVE", 2.4, 10.75)
280 CALL LINK("LABEL", "99'er Magazine")
290 CALL LINK("GRAPH")
```

OK, that's your new tool! I wonder what you will be plotting next. . .

### **ACKNOWLEDGMENT**

This package was developed with the computer facilities at the University of Dallas as a project under the guidance of Dr. Ber-

nard As	ner a	nd Dr. Carlisle Ph	illips.		79 PF
******	****	**********	SCAN	EQU	>000E
*	>	BIT1 < *	SNT	EGU	>1B00
* PART	ONE	OF PLOTTING *	STATUS		>837C
	ROU	TINES *	VDPRD		
******	****	*********		EQU	>8800
# BY JO	DE DE	VINCENTIS, JR.	VDPRST		>8000
		SION 2.2.1ALMM	VDPWA	EQU	>8C02
- // -		COLON EDELINE	VDPWD	EQU	>8000
•	TT T1	'BIT MAP LINE'	XP1	EOU	1
∗	, , , ,	DIT THE LINE	^ - 4	EOU	3
*	DEE	DDAM	YP1	EGN	2
	DEF	DRAW CC. FAR	YP2	EQU	4
	DEF	GCLEAR	*		
	DEF	BRAPH		AORG	ORIGIN
	DEF	LABEL	DELTAX	DATA	0
	DEF	MOVE	DELTAY	DATA	0
	DEF	SCALE	SAVR11	DATA	o T
	DEF	XAXIS	STASAV	DATA	0
	DEF	YAXIS		•	>4102,>3700,>0000
					>0000
	REF	NUMREF	VAI 191		>4101,>5B00,>0000
	REF	STRREF	VIII.		>0000
	<del></del> -		UNDDES		-
A	EQU	5	ADEMER		>8002, >81E0, >8206
ADR	EGU	ō			>83FF, >8403, >8506
ARG		>835C			>8717
	EQU	_	X	DATA	
B	EGU	6	X 1	DATA	
BASE		>8343	Y	DATA	
CFI		>12B8	.Y1	DATA	0
CHAR		5	XSAVE	DATA	0
CHRCNT	EQU	8	YSAVE	DATA	0
CNT	EOU	9	XDOT	DATA	>4001,>0000,>0000
COLOR	EQU	>1000		DATA	>0000
COUNT	EQU	9	YDOT	DATA	>4001,>0000,>0000
DELTAA	EQIJ	7		DATA	>0000
DELTAB	EQU	6	XMAX	DATA	>4102,>3700,>0000
DRFLAG	EGU	4			>0000
ERR	EQU	10	XMIN	DATA	>0000,>0000,>0000
ERRBA	EQU	>1600		DATA	>0000
ERRBS	EQU	>1700	YMAX		>4101,>5B00,>0000
ERRCOD		>8322			>0000
ERRNO	EQU	>1400	MIN	DATA	
ERROR	EQU	>OOCE		DATA	
ERRSNM		>1500	*		<del>-</del> -
ERRUN	EQU	>2500	BUFFER	BYTE	>FF
FAC	EQU	>834A	——· · <b>-</b> -'\	BSS	>FF
FADD	EQU	>ODBO		EVEN	~ E #
i i			CONREG		<b>320</b>
FCOM	EQU	>0D3A >0EE4		BSS BCC	>20
FDIV	EØA	>OFF4	MREGS	BSS	>20
FLAG2	EOU	8	PREGS	BSS	>20
FLAG4	EQU	9		BSS	>20
FMUL.	EQU	>0E88	*		
FSUB	EQU	>0D7C	<b>#</b>		<b></b>
6PLWS	EQU	>B2E0	DRAW	MOV	əstatus, əstasav
KEYCOD	EQU	>8375		MOV	R11, 25AVR11
MASK	EQU	6		BLWP	2DRAW1
MYPGT	EQU	>2800		LWPI	GPLWS
ORIGIN		>7118		MOV	95AVR11,R11
OVF	EQU	>8354		MOV	SUTATES, VASATES
PET	EQU	>2000		RT	
PGT	EØU	>0000	*	- <b>-</b>	
PNT	EOU	>1800	*		Continued on p. 62
1 441			<u> </u>		· · · · · · · · · · · · · · · · · · ·



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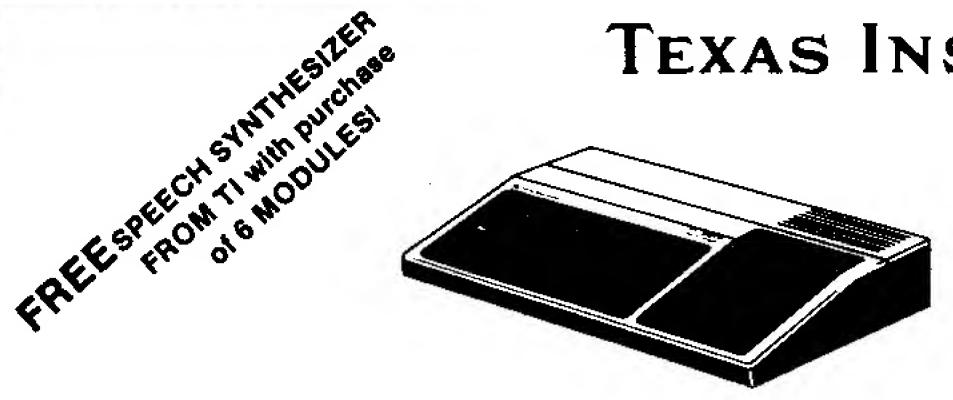
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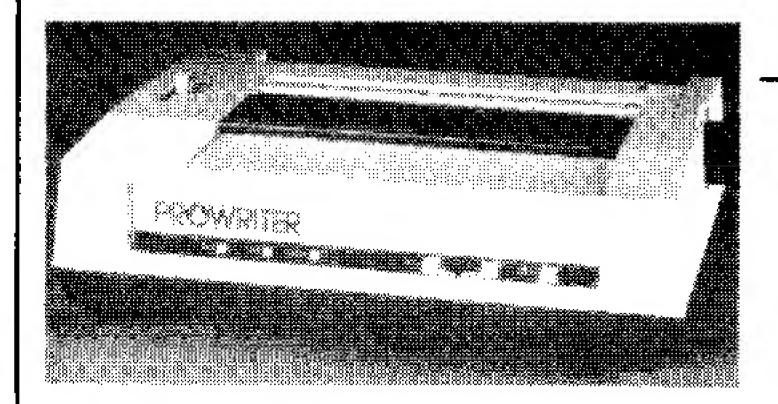
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<del></del>			<del> </del>					
Plott	ing.	from p.61		BLWP				MREGS
GCLEAR	MOV	STATUS, STASAV		LWPI	GPLWS	Ì	MOVB	STATUS, RO
	MOV	R11,95AVR11		MOV	95AVR11,R11		ANDI	RO,>4000
	BLWP	<b>OCLEAR</b>		MOV	eutatav, estatus		JGT	AXCON1
	LWPI	GPLWS	١	RT			LI	RO, ERRBA
	MOV	25AVR11,R11	*				B	PERRSYS
	YOM	SUTATEG, VASATEG	*			AXCON1	MOV	ex,exsave
	RT		XAXIS	MOV	R11, 25AVR11		MOV	ay, aybave
*				MOV	estatus, estasav		LI	R2, ARG
*				LI	RO, MREGS+16		LI	R3, SREGS
GRAPH	BLWP	<b>OVDPSET</b>		CLR	*R0+		BL	<b>OTRDATA</b>
	BLWP	<b>ƏGRPAH1</b>		CLR	*RO		MOV	FLAG2,R1
	LWPI	GPLWS		BLWP	PAXIS		SRA	R1,1
SCANIT	BL	ƏSCAN		LWPI	GPLWS		AI	R1,1
	MOVB			MOV	SUTATEG, VASATEG		BLWP	<b>OCUNVTR</b>
	JNE	SCANIT		MOV	əsavrii, Rii		MOV	RO, DX (FLAG4
	LI	RO. >0020		RT			LI	R2, SREGS
	MOVB	PKEYCOD, RO	*				LI	R3,FAC
	CI	RO,'Q'	*				BL	STRDATA
	JNE	SCANIT	YAXIS	MOV	R11, ƏSAVR11	į	MOV	FLAG2,R1
	LI	RO. VDPRST		MOV	OSTATUS, OSTASAV		SRA	R1,1
	BL	<b>QVADR</b>		LI	RO, MREGS+16		AI	R1,1
	MOV	92,R11		LÏ	R1,2		BLWP	<b>OCONVTR</b>
	В	<b>*R11</b>		MOV	R1, *RO+		MOV	RO, DX1 (FLAS
*				SLA	R1,1		S	<b>Θ</b> Χ (FLAG4) ,R
*				MOV	R1, #R0		MOV	RO, DELTAX
LABEL	MOV	PARATUS, PSTASAV		BLWP	<b>PAXIS</b>		CLR	RO
	MOV	R11, ƏSAVR11		LWPI	GPLWS		LI	R1,3
	BLWP	PLABEL1		MOV	eutatav, estatus		BLWP	<b>ONLIMREF</b>
	LWPI	GPLWS		MOV	<b>ƏSAVR11,R11</b>		LI	R1,2
	MOV	əsavrıı, Rii	_	RT			MOV	FLAG4, FLAG4
	MOV	SUTATEG, VASATEG					JEQ	AXCON2
	RT						SRA	R1,1
*			AXIS	DATA	MREGS, AXIS1	AXCON2		DCONVTR
*			*		<b></b> _		NEG	FLAG2
MOVE	MOV	PSTATUS, PSTASAV	AXIS1	CLR	RO		NEB	FLAG4
	MOV	R11, 9SAVR11		LI	R1,2		MOV	RO, ay (FLAG4
	BLWP	aMOVE1		BLWP	<b>ONUMREF</b>		MOV	RO, SY1 (FLAS
	LWPI	GPLWS		LI	R2,FAC		CLR	DELTAY (FLA
•	MOV	25AVR11.R11		LI	R3, ARG		BLWP	adraw3
	MOV	SUTATEG, VASATES		BL_	<b>OTRDATA</b>		MOV	SXSAVE, SX
	RT	- <b>,</b>		CLR	RO		MOV	aysave, ay
*	-			LI	R1,1	_	RTWP	
*				BLWP	. —	¥ .		
SCALE	MOV	PSTATUS, PSTASAV		LWPI		*	DAME	·
	MOV	R11, 25AVR11		BL.	<b>OFCOM</b>		PAGE	
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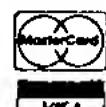
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*******		CLR	R6	DRAW4	ABS	PDELTAX
* > BIT2 < *		JMP	CVCON2		ABS	<b>PDELTAY</b>
* PART TWO OF PLOTTING *	CVCON1	LI	R5, 16		C	DELTAY, DELTAX
* ROUTINES *		LI	R6,8		JGT	DRCON1
*************	CVCON2		R2,FAC		MOV	DELTAX, DELTAA
* 99'ER VERSION 2.2.1ALMM	CVCONZ		•	1	MOV	DELTAY, DELTAB
* 77 EN VERSIEN Z.Z.IMERHI		LI	R3, AR6		MOV	ex.a
* * * * * * * * * * * * * * * * * * *	i	BL	PTRDATA		HOV	ay, B
#LINE 0002	1	LI	R2, XMIN		CLR	DRFLAG
CLEAR DATA MREBS, CLEAR1		A	R5, R2		JMP	DRCON2
CLEAR1 LI R1, MYPGT		LI	R3,FAC	DRCON1		
LI R2,>1800		BL	<b>OTRDATA</b>	PUCCHI	MOV	DELTAX, DELTAB
CLCON1 CLR *R1		LWPI	·		HOV	DELTAY, DELTAA
INCT R1		BL	efsub		MOV	ex,B
DECT R2		LWPI			MOV	ay, a
JNE CLCON1		LI	R2,FAC	·	SETO	DRFLAG
ELR ƏX		LI	R3,ARG	DRCON2	C	ex,ext
CLR ƏY		BL	<b>PTRDATA</b>	-	JLT	DRCON3
LI R2, VAL255		L.I	R2, XDOT		SETO	R2
LI R3, XMAX		Α	R6,R2	İ	JMP	DRCON4
BL ƏTRDATA		LI	R3, FAC	DRCON3	LI	R2,1
LI R2, VAL191		BL.	<b>OTRDATA</b>	DRCON4	C	9Y, 9Y1
LI R3, YMAX		LWPI	GPLWS		JLT	DRCON5
BL STRDATA		BL	<b>ƏFDIV</b>		SETO	R3
LI R3,>4001		BL	<b>QCFI</b>		JMP	DRCON6
MOV R3, DXDOT		LWPI	CONREG	DRCON5		R3,1
MOV R3, aydot		MOV	@FAC, #R13	DRCON6		DELTAA, COUNT
CLR DXMIN		RTWP	•		INC	COUNT
CLR SYMIN	*				MOV	DELTAB, RO
LI R1.3	*				SLA	RO, 1
	DRAW1	DATA	MREGS, DRAW2		MOV	DELTAA, R1
•	DRAW3		SREGS, DRAW4		S	R1,R0
CLCON2 CLR	*				MOV	RO, ERR
CLR SYDOT(R2)	DRAW2	CLR	RO		S	R1,R0
CLR DXMIN(R2)	2011000	LI	R1,1		MOV	DELTAB, R1
CLR SYMIN(R2)		BLWP	ONUMREF		SLA	R1,1
INCT R2		BLWP		REDRW1	HOV	DRFLAG, DRFLAG
DEC R1	!		<b>PCDNVTR</b>	I I C DI CHI	JNE	REDRW2
JNE CLCON2		MOV	RO, ax1		MOV	A, ax
RTWP		S	ax, Ro		MOV	
*		MOV	RO, DDELTAX			B, ay
*		CLR	RO	DEDOMO	JMP	REDRW3
CONVTR DATA CONREG, CONVT1		LI	R1,2	REDRW2		A, ay
<b>*</b>		BLWP	<b>ONUMREF</b>		MOV	B, ax
CONVT1 MOV 02(R13),R5		BLWP	<b>PCONVTR</b>	REDRW3		PPLOT
CI R5,1		MOV	RO, <b>3</b> Y1		MOV	ERR, ERR
JNE CVCON1		S	ay, Ro		JGT	CHNG
CLR R5		MOV	RO, DELTAY			Continued on p. 66
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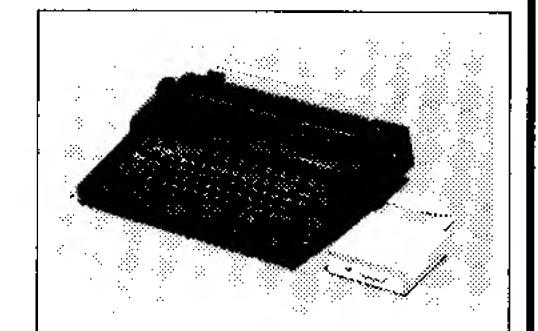
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### PARSEC... from p.47

gaming contest. Deeply involved in the fast-paced action—with over 280,000 points and still slightly shaken from the last surprise attack by KILLER SATELLITES—the realization that I was rapidly becoming the center of attention didn't strike home until a piercing voice from the growd cried out, "Go find the Judge!" That did it... I snapped out of my fantasy world of interstellar combat, quickly turned off the computer (thus erasing my score), and lickety-split lost myself on the crowded show floor. Let the *kids* win the prizes; was supposed to be there anonymously—and be working!

How does all this relate to the "ultimate" video game? Let's just say: that *Parsec* isn't quite there yet. Sure, it contains the requisite technical

elements—a mixture of special effects and machine features that define the state of the art in personal computer gaming—but there's definitely room for improvement. Some enhancements I'd like to see in future generations of space games include 3-D perspectives: shadows of moving objects; ground-toair interaction; auxiliary windows in the playing screen for long-range scanning. and monitoring other ship functions. and the deployment of additional weapon/defense systems.

Additionally, I'd like to see the concept of distress signals and rescue attempts implemented. This might lend itself to multi-player cooperation and interaction—e.g., the entire family can work together to defeat the enemy.

I haven't even addressed the concept of speech *recognition* in a video game of this type because the low-cost implementation of this technology is still at least a year away. But just imagine if instead of having to hit particular keys on the keyboard to vary your lift. you could verbally command your computer, "Lift 1... Reverse Engines... Lift

But enough of this. I've probably already told you more than you need to know. After all, we game designers must keep some secrets to ourselves... So go ahead and buy Parsec; you'll have a ball and might even discover some hand-eye coordination you never thought you had. As for me, it's back to the video gaming grid. Hackers like me gotta keep on working hard to stay ahead of those TI programmers. . .



### Gold Rush... from p.51

2250 DATA 11,3,5.MINE FOREMAN,24,1, YOUR CHOICE?, 12345

2260 DATA 24,17,"GOLD"

2270 DATA 440,660,550,660,770

2280 READ XC, YC, A\$ :: DISPLAY AT (XC ,YC):A\$ :: RETURN

2290 READ XC, YC, AS :: DISPLAY AT (XC .YC):A\$ :: ACCEPT AT(XC,YC+LEN (A\$)):AN\$ :: RETURN

2300 READ XC, YC, A\$, B\$ :: DISPLAY AT (XC, YC):A\$ :: ACCEPT AT(XC, YC+ LEN(A\$)) VALIDATE (B\$): AN\$ :: RE TURN

2310 DISPLAY AT(22,1):A\$ | RETURN

2320 DISPLAY AT (24, 1) SIZE (16): A\$ :: RETURN

2330 CALL KEY(0,K,S):: IF S=0 THEN 2330 ELSE RETURN

2340 SUB AR(P1,P2,Z,M)

2350 IF M(3 THEN 2370

2360 DIM M\$(19):: MN\$=RPT\$(CHR\$(1), 28):: FOR X=1 TO 19 :: M\$(X)=M N# :: NEXT X :: SUBEXIT

2370 IF M=2 THEN 2390

23B0 Z=ASC(SEG\$(M\$(P1),P2.1)):: SUB EXIT

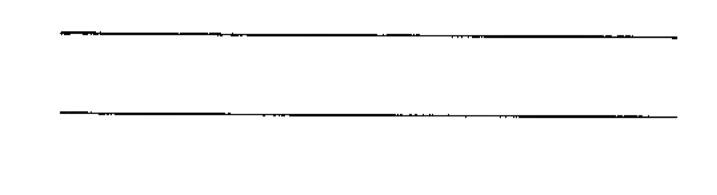
2390 M\$ (P1) = SEG\$ (M\$ (P1), 1, P2-1)&CHR \$(Z)&SEG\$(M\$(P1),P2+1,29-P2):: SUBEND

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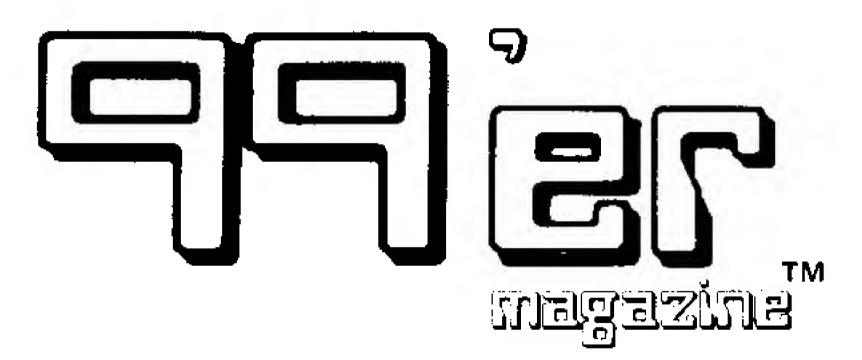
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Ah, it worked! Now, pull the right toggle to turn to the right. Oops! You're overshooting — pull both toggles to cut the glide — not for too long or you'll have a hard landing and be out of the competition. Things sure happen fast as you get close to the ground!

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Follow the ridge to gain some altitude. Hey! Don't climb so steeply — you might stall and not recover in time. Phew, that was close.

OK, head out cross-country now. Try to work the thermals over rocky fields, but avoid lakes and forests — they usually have heavy downdrafts over them. Look at that eagle circling; he sure knows where the thermals are.

It's getting late; time to be heading back. The thermals are gone and there is no more ridge-lift, so you had better pick your spot to land. Push the bar forward slowly and stall it on. Slow down or you'll break your neck! ... Watch out for the tree! . . . That's it.

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	Plott	ing.	.from p.63
		Α	R1,ERR
		JMP	INCR
	CHNG	MOV	
	Chito		•
		JNE	•
		Α	R3, B
		JMP	REDRW5
i	REDRW4	Α	R2,9
į	REDRW5	A	RO, ERR
	INCR	MOV	DRFLAG, DRFLAG
	414Q11	JNE	REDRW6
		Ą	R2,A
		JMP	REDRW7
	<b>REDRWA</b>	Α	R3.A
	REDRW7	DEC	COUNT
		JNE	
•		MOV	<b>y</b>
ł		MOV	9Y1,9Y
١		RTWP	
ı	*		
١	*		
١	ERRSYS	MOU	PA SEPPOR
ı	EUUDID		•
١			GPLWS
١		LI	R11,>000E
١		MOV	#R11,R11
ł		В	<b>DERROR</b>
1	*		
	*		
	-	DATA	MDECC CODANA
		DATA	MREGS, GRPAH2
	*		
	GRPAH2	CLR	RÓ
		BL	<b>W</b> ADW
		L.I	R1,>1800
		LI	•
ŀ	COCONI		
	GRCON1		*R2+, aVDPWD
		DEC	R1
		JNE	GRCON1
		RTWP	
	*		
	i i		
	T ABEL 1	DATA	MACCO LARCES
	LABEL 1	DATA	MREGS, LABEL2
	*		
	LABEL2	CLR	RO
		LI	R1,1
		LI	R2,>FF00
			T
		MUVE	R2, DBUFFER

R2, BUFFER

ĻΙ

MOV ax,xP1	CI ADR, MYPGT+>180
CI XP1,256	JL LBCON9
JLT LBCON1	RTWP
RTWP	LBCON9 DECT ENT
LBCON1 CI XP1,>BOOO	JNE LLOOP2
JL LBCON2	DEC CHRCNT
RTWP	JNE LLOOP1
LBCON2 MOV aY, YP1	LI RO,>FF00
CI YP1,192	MOVB RO, DBUFFER
JLT LBCON3	RTWP
RTWP	*
LBCON3 CI YP1,>8000	*
JL LBCON4	MOVE1 DATA MREGS, MOVE2
RTWP	*
LBCON4 CLR CHRCNT	MOVE2 CLR RO
MOVB @BUFFER, CHRCNT	LI R1,1
SWPB CHRENT	BLWP ONUMREF
NEG YP1	BLWP aCONVTR
AI YP1,191	MOV RO, ax
SRA XP1,3	ELR RO
SRA YP1,3	LI R1,2
SLA YP1,5	BLWP DNUMREF
A XP1,YP1	BLWP aCONVTR
MOV YP1,ADR	MOV RO, ay
A CHRCNT, YP1	RTWP
CI YP1,768	*
JL LBCON5	<b>‡</b>
LI R6,768	PAGE
S R6, YP1	********************
MOV YP1, CHRCNT	* > BIT 3<
LBCON5 LI R7, BUFFER+1	* PART THREE OF PLOTTING (
SLA ADR, 3	**************
AI ADR, MYPGT	* 99'ER VERSION 2.2.1ALMM
LLOOP1 CLR CHAR	1 77 EN VENSIUM 2.2. IMEMIN
MOVB #R7+, CHAR	
SWPB CHAR	*LINE 0002
CI CHAR, 32	BLOT DATA DOCCO OLOTA
JHE LBCON6	PLOT DATA PREGS, PLOT1
CLR CHAR	-
JMP LBCONB	
LBCON6 CI CHAR, 127	CI XP1,256
JLE LBCON7	JLT PLCON1
LI CHAR, 127	PLCON1 CI XP1.>8000
LBCON7 AI CHAR, -32	
SLA CHAR, 3	JL PLCON2
LBCONS AI CHAR, CHRTBL	RTWP
LI CNT,8	PLCON2 MOV ay, YP1

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	CI	YP1,192		₽L	<b>OTRDATA</b>		LI	R9,>0100	JNE VDCON2
	JLT	PLCON3		LI	R2,XDOT	-	CB	R9, advf	LI RO,PNT
D. GOV.	RTWP			A	R5,R2		JNE	SCCON2	BL SVADW
PLCON3	_	YP1,>8000		LI	R3,ARG		LI	RO, ERRNO	LI R3,3
	JŁ	PLCON4		BĻ	ƏTRDATA		В	<b>PERRSYS</b>	VDCON3 CLR R1
DI COMA	RTWP			LWPI		SCCON2		R7	LI R2,256
PLCON4	MOV	XP1, XP2 YP1		BL.	9FD1V		CLR	R8	VDCON4 MOVB R1, QVDPWD AI R1. >0100
	AI	YP1,191		LWPI				ƏFAC,R7 ƏFAC	AI R1,>0100 DEC R2
	MOV	YP1, YP2		LI	R2,FAC			PFAC,R8	JNE VDCON4
	SRA	YP1,3		LI A	R3,XDOT R5,R3	ł		R7	DEC R3
	SLA	YP1,5		BL.	TRDATA			RB	JNE VDCON3
	SRA	XP1,3		B	*R10			RB, OFAC	RTWP
	MOV	YP1,ADR	*	-	7.1.2.0			<b>ƏFAC</b>	*
	A	XP1,ADR	NUMGET	MOV	R11,R10			R7, ƏFAC	*
	SLA	ADR, 3		CLR	RO		LI	R2,FAC	*
		YP2,>0007		LI	R1,2		LI	R3,XDOT	PAGE
	A	YP2, ADR		A	R5,R1		A	R5, R3	***********
	AI	ADR, MYPGT *ADR, CHAR		LΙ	R2,FAC		BL	PTRDATA	* > BIT4 < *
		XP2,>0007		LI	R3,XMAX		Ð	#R10	* PART FOUR OF PLOTTING *  * ROUTINES *
	MOV	ADR, R4		A Bollubo	R6,R3 <b>ƏNUMRE</b> F				*************
	MOV	XP2,R0		BL	STRDATA	TRDATA	MOV	#R2+, #R3+	* 99'ER VERSION 2.2.1ALMM
	L., I	MASK,>8000		DEC	RI		MOV	*R2+, *R3+	*
	SRC	MASK, O		LI	R2.FAC			*R2+, *R3+	*LINE 0002
	MOV	R4,ADR		LI	R3, XMIN		MOV	*R2, *R3	*
	SOC	MASK, CHAR		A	R6,R3		RT		CHRTBL DATA >0000, >0000, >0000, >0000 blank
		CHAR, *ADR		BLWP		*			DATA >0010, >1010, >1010, >0010 !
•	RTWP			BL	atrdata	¥	,	DO 1400-	DATA >0028, >2828, >0000, >0000 "
<b>±</b>				L I A	R2, XMAX	VADW VADR	ORI SWPB	RO,>4000	DATA >0028,>287C,>287C,>2828 #
SCALE1	ΠΔΤΔ	MREGS, SCALE2		LI	R6,R2 R3,AR6	AUDIC		RO, ƏVDPWA	DATA >0038,>5450,>3814,>5438 \$ DATA >0060,>6408,>1020,>4000 %
*				BL	TRDATA		SWPB		DATA >0020, >5050, >2054, >4834 &
SCALE2	CLR	R5		LWPI				RO, avdewa	DATA >000B, >0810, >0000, >0000
	CLR	R6		BL	<b>aFCOM</b>		RT	-	DATA >0008, >1020, >2020, >1008 (
	BL	PNUMBET		LWPI					DATA >0020, >1008, >0808, >1020 }
	ΓÏ	R5,2		MOVB	<b>25</b> TATUS, RO	*			DATA >0000,>2810,>7C10,>2800 #
	ŁΙ	R6,16		ANDI	RO,>4000	VDPSET	DATA	MREGS, VDP1	DATA >0000, >1010, >7C10, >1000 +
	BL CLR	anumget i R5		JGT	SCCON1	UDD:		DA LINASSA	DATA >0000,>0000,>0030,>1020 ,
	CLR	R6		LI	RO, ERRBA	VDP1	LI	R2, VDPREG	DATA >0000, >0000, >7000, >0000 -
	BL	SNUMSUB	SCCON1	<b>D</b>	DERRSYS	VDCDN1	MOV	R1,7	DATA >0000,>0000,>3030 .
	LI	R5,8	± ±	D	*R10	ADCOMI	BL	*R2+,R0 avadr	DATA >0000,>0408,>1020,>4000 / DATA >0038,>4444,>4444,>4438 0
	LI	R6,16	NUMSUB	MOV	R11.R10			R1	DATA >0038, >4444, >4444, >4438 0 DATA >0010, >3010, >1010, >1038 1
	BL	<b>SNUMSUB</b>	·· IUUD	LI	R2, XMIN			VDCON1	DATA >003B,>4404,>0810,>207C 2
	CLR	R5		Ā	R6,R2			RO, SNT	DATA >0038,>4404,>1804,>4438 3
	BL	PULMDIV		LI	R3,FAC	]	LI	R1,>D000	DATA >0008, >1828, >487C, >0808 4
	LI	R5,8		BL	<b>ƏTRDATA</b>		BL	<b>AVADW</b>	DATA >007C, >407B, >0404, >4438 5
	BL	SUUNDIA		LI	R2, XMAX		_	R1, QVDPWD	DATA >0018, >2040, >7844, >4438 6
•	RTWP			A	R6,R2		LI	RO, PCT	DATA >007C,>0408,>1020,>2020 7
¥ NUMDIV	MOV	R11 R10		LI	R3,ARG			SVADW	DATA >0038, >4444, >3844, >4438 B
. 421 ID ‡ A	LI	R11,R10 R2,VAL255		BL LWPI	OTRDATA GPLWS		LI	R1,COLOR	DATA >0038,>4444,>3004,>0830 9
						LIBOONIO	LI	R2,>1800	DATA >0000,>3030,>0030,>3000 :
	Α	R5.R2		HI	9F 21 IB	(1) 1 1 mm	Marian Services	י ממשמטע וא	
	A LI	R5,R2 R3,FAC		BL LWPI	afsub Mregs	VDCON2	DEC	R1, avprwd R2	DATA >0000, >3030, >0030, >1020; Continued on p. 70

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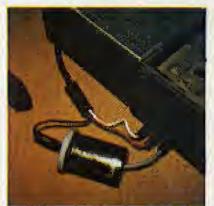
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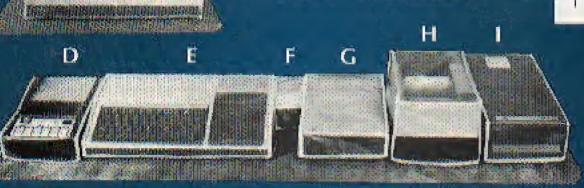
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